The Builder.

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The Ancient Lights Bill.

THOUGH the Ancient Lights Bill was read a first time last month in the House of Commons, we may at once say that, having regard to the period of the Session now reached, and to the state of Parliamentary business, there is not the remotest probability that this measure will become law. A consideration, therefore, of its terms must be regarded as useful in view of the future rather than of the present. The Bill is the result of the deliberations of the Royal Institute of Architects through a Committee, and of those of the Surveyors' Institution. These investigations and deliberations have been going on for a number of years, and we must confess that the result is rather infinitesimal when we consider the time and labour that have been given to the subject.

It was not unreasonable to expect that a clear and concise code of the law of light would have been formulated which would contain a complete statement in ordered array of the whole existing law on this subject, amended by the light of the investigations of the Committee. All, however, that we have now before us is a Bill by which, in some details, the present law is amended. Thus if, and when, the Bill becomes law, there will be added to the considerable mass of judicial decisions and to the existing statute law, such as the Prescription Act of 1832, yet another piece of law—a new statute which must inevitably increase rather than diminish litigation.

What, then, are the main points of the proposed legislation? The first is the abolition of the right to an extraordinary amount of light. In this part, however, there are two limitations: (*a*) That this section shall not apply to a tenement in which a trade has been carried on continuously for ten years, and which required an extraordinary amount of light; (*b*) where the right becomes absolute after the passing of the Act (as our readers well know, there has been for many years a considerable conflict of judicial decisions in regard to the right to an extraordinary amount of light); and the more recent cases, especially that of Warren *v.* Brown in the Court of Appeal in 1901, have been in favour of the occupier of the dominant tenement who claimed an extraordinary right to light. As those who have read the articles published in this journal on this particular branch of the subject are aware, we have always urged that the right to an extraordinary amount of light should not be allowed by the courts. It is more than the reasonable man demands, and a person who requires an unusual degree of light for some business purpose should not obtain it to the disadvantage of his neighbours; therefore, we should have been glad if this Bill had followed the lines of some judicial decisions, and altogether abrogated the right to an extraordinary amount of light.

The next important point refers to the obstruction of light by a notice in place of a physical obstruction. The only means at present by which the growth of a right to light can be prevented is by the actual obstruction by a screen of the light to the windows of the dominant tenant. This has been regarded as an unreasonable and rather a brutal manner of preventing the accretion of such a right. It must however be borne in mind that the owner of a dominant tenement can always do away with this obstruction by entering into an agreement under which, while he enjoys the light, he admits that he is not gaining any prescriptive right. Therefore there is no necessity why a huge hoarding should remain in front of a window. However, the present Bill proposes that the owner of a servient tenement may serve upon the occupier of, and upon any other persons whom he knows to be interested in the dominant tenement, a notice, accompanied by a plan and elevation showing the windows through which the light passes. This notice shall be deemed to be an obstruction to the light as if it were an actual physical obstruction.

On the face of it there is something to be said for this part of the Bill, but when it comes to be examined it appears likely to result in a great deal of litigation. If such a notice as this could be filed in some public office and preserved as a kind of record relating to a property, the arguments in favour of this change would be more powerful; but a moment's consideration will show that the least want of precision in a notice of obstruction will open the door to any amount of litigation. It is equally certain also, having regard to the numerous interests which are nearly always to be found in property in this country, that some person having some kind of right in a building will not consider himself bound by the notice. From the very words of the chief section it is apparent that difficulties must arise, because if the notice is served only on the occupier the landlord may never hear anything of it. The words "upon any other persons" obviously present to the person giving the notice an indefinite duty; for how is he to discover all those who are interested in the property, tenants for life, mortgagees, and so forth? We fear, therefore, that this part of the Bill, though well intentioned, is one which will not produce a true reform of the law.

Part 6 of the Bill is obviously intended to prevent litigation by the preservation of records of houses which have been rebuilt. The provisions of this part of the proposed measure are likely to be of practical utility. Briefly stated, their effect is that the owner of a building which is about to be taken down or rebuilt, may cause plans, sections, and elevations of it to be prepared, and may obtain from the District Surveyor, after inspection, a certificate of their correctness. It is unnecessary to go into the details of this part of the Bill; it is sufficient to say that the Official Surveyor, as he is called, shall keep a register of these drawings, which are to be deposited at the town or county hall. The certificate given by the Surveyor is to be conclusive evidence of the correctness of the plans, and should therefore put a stop to wrong assertions as to the size and character of the windows of the buildings to which they refer.

Part 7 of the Bill is likely to be a good deal more doubtful in its practical results. Here again the prevention of litigation is clearly aimed at, but we feel considerable doubt whether this part of the measure will have the desired result. Section 7 enacts that where a servient owner is about to erect a new building or alter an existing one he shall, at the request of the dominant owner, give facilities to him or his agent to inspect the plans, elevations, and sections of the intended new buildings or alterations. If there are none, then the servient owner shall give all reasonable information on the subject. If the dominant owner considers that his rights will be infringed he may serve a notice of objection on the servient owner, and if this is accepted, there is an end of the difficulty. If, however, the servient owner is not willing to accept the terms of this notice he must serve a counter notice of refusal, and the result of this will be, putting aside details, an arbitration. It does not, however, appear that this procedure is to do away with the right of either party to go to law—that is to say, if the dominant owner does not ask for plans, and he afterwards finds that his rights to light have been infringed by the new building, he has still his ordinary legal remedies. It would thus appear that the result of this part of the Bill would be to add to the means of litigation. We are inclined also to think that the owner of property who is unreasonably asked for a plan may have a grievance, and we are also of opinion that it is a somewhat dangerous mode of procedure which enables the owner of a building before he is in any way hurt to pry into the affairs of his neighbour. We confess that we should instead have preferred to see the existing law amended in regard to injunctions and damages. As our readers are aware, the late Lord Cairns many years ago passed an act allowing damages to be given in the place of an injunction where a judge thought it was reasonable. We believe that the simplest and most satisfactory reform of the law would be to enact that an injunction shall never be granted where the infringement of the rights of the owner of the dominant tenement can be recompensed by means of damages. The last section of the present Bill states that a judge may, if he considers that the claim can be reasonably satisfied by damages, refer the case to arbitration. But why this reference to arbitration? One fault of the present Bill lies in there being too much arbitration in it. Arbitration is not at all cheaper than hearing by a judge, and is not so satisfactory to the parties, and we think that if the infringement of rights to light could, in all cases where it was at all reasonable, be recompensed by damages, that would be sufficient.

There are other provisions in this Bill to which reference should briefly be made, such as the section which enacts that no title to a right to light shall be obtained by the owner of any building which shall have been erected after December 31, 1890, and which abuts on any street and where such right to light would have been obtained by passing over a tenement on the opposite side of the street. This would, of course, put an end to the growth of prescriptive rights to light in nearly all parts of a town. Having regard to the large definition of the word "street," it would have been better at once to have enacted that no rights to light shall be obtained in a town; because, in nine cases out of ten, nearly every right to light is obtained in respect of a cone of light passing over a street. But this, it must be confessed, would be an exceedingly drastic change, which is hardly likely to pass through Parliament, and under these circumstances we are inclined to think that this part of the Bill would be better omitted, and if the law of light is not to be codified, we should prefer to see this measure modified next session in the directions we have indicated.

THE ARCHITECTURAL ASSOCIATION SKETCH BOOK.

IN welcoming the appearance of Volume VI. of the New Series of the Architectural Association Sketch Book, we may congratulate the Association on the remarkable manner in which this series of sketches has been kept up for so many years, and on the continued excellence and interest of the work shown in it. Some old names which were formerly prominent we miss in the present list of contributors; but on the other hand there are new ones whose drawings assist in keeping up the old standard.

If there is any change in the general tendency and character of the collection, it may perhaps be found, if our memory of older volumes serves us rightly, in a rather increased space and importance given to measured drawings of old work, rather than to drawings of purely artistic character. Thus we have no less than nine plates of measured drawings of Bolsover Castle by Mr. F. W. C. Gregory, and five of Houghton Hall by Mr. Stanley Towse, and a good many others of minor buildings of antiquity. This is perhaps well, as it gives a practical value to the collection; but at the same time the kind of power which enables an artistic sketcher to convey forcibly the actual effect of a building or a detail, in a drawing which shall be in itself also a work of art, as a specimen of execution with brush or pencil, is not to be overlooked, and may in a sense be more valuable than the measured drawing. It does not in the same way give information, but it stimulates the imagination and the sense of the picturesque, and adds to the joy of life.

Nevertheless, Mr. Gregory is to be congratulated on the care and fulness of his set of drawings of Bolsover just referred to, which, with their accurate and careful delineation, and the liberal introduction of figured measurements, form a monument of conscientious work of the kind. A good deal of information is scattered about the plates in the way of written notes, arranged in a more or less decorative manner, and the author is not above writing these legibly, in good clear square letters, a point sometimes overlooked either by those who are content with careless writing, or by those who consider that there is an artistic element in writing which is illegible: a vicious error; the finest print writing of the Renaissance, with the most finely formed letters, is also the clearest to read. We observe, by the way, that what we have always known as "mouldings" it is now the fashion to define in the text as "moulds." The old word was a better definition of facts; and it may be added (though probably few architectural draughtsmen are aware of the fact) that the word "moulds" is now habitually used, in researches into the impurity of air, for a particular class of floating impurity not coming under any other head; so that its associations, with those conversant with scientific work in ventilation, are not architectural at all. In these and most of the other sections of mouldings published in the sketch-book the profiles of mouldings are shown by comparatively thin black lines in which it is not always easy to discern at a glance which margin of the line represents the profile and which is only a backing to it. It is a much better and more workmanlike way to show the profile by an accurate thin line and to shade on the inner side of it, as is done, for instance, with the mouldings in Mr. Brown's drawings of Eltham Palace, and Mr. Nicol's of the church at Norrey. Then the eye sees the true profile at a glance.

The measured drawings of details of lead and iron work, a ceiling, and fireplaces, from Albyns (Essex), by Messrs. E. B. Nevinson and J. F. Newton, are interesting and very cleanly drawn, and we are especially obliged to them for the three fireplaces, which are not very well known, and which show some rather peculiar and characteristic bits of detail; notice, for instance, the imitation of rusticated masonry in the lower portions of the colonnettes. Let us add, however, that this is not by any means a detail for imitation—indeed, it is rather false taste, but it is interesting as an example of the peculiarities of the Jacobean chimney piece designer.

Mr. E. H. Bennett's set of drawings of two of the porches of Chartres, the first reproductions from brush drawings in the book, are artistic in style, and give very well the feeling of the quaint lengthened out figures of the sculpture decoration. Part 2 commences with another set of measured drawings: Aston Hall, by Mr. E. F. Reynolds; a very good set, but the building is not so interesting as Bolsover. Mr. J. A. Swan supplies a large line elevation of a rather coarsely designed fireplace in this somewhat overrated building. As a detail of execution, we may observe that shadows shown by line shading, like that under the projection of the chimneypiece in this drawing, should not be defined by a bounding line, which gives them too decisive and hard an appearance for shadow; it is much better to let the shading lines simply stop, and make their own outline. Mr. Hart's sketch of the candelabrum in the Basilica of San Antonio, Padua (not "candelabra," please, which is plural), is a very good and artistic sketch; and very effective also is the one on the next page, by Mr. Rupert L. Austin, of a tripod cistern for wine-cooling (seventeenth century) in the South Kensington Museum; though the near leg, if it is intended to be the same curve as the others, is a little out of drawing. The decoration on the bowl is indicated with great vigour of touch, and a section to scale is added. The drawing of the book, though, for artistic effect and boldness of style, is Mr. Varndell's capital from St. Eustache Paris in Part 3; a very fine bit of work, up to the best traditions of the Sketch-book. Among the other contents of Part 3 we find measured drawings of the porch and an exterior bay of the nave of Walpole St. Peter's, Norfolk, by Mr. J. Myrtle Smith; measured drawings of the porch of St. Mary-le-Strand, by Mr. J. G. Wiles; the simple lines of the Bookham Almshouses, York, with their interesting Transitional doorway (Mr. W. S. A. Gordon), and a good set of

measured drawings of Wolvesey House, Winchester, by Mr. L. G. Detmar. In Part 4 Mr. Nicol gives a plan and section of the choir of the church at Norrey, near Caen, with its apse on the lines of a semi-pentagon; and M. C. de Gruchy contributes a very good set of drawings of the church of St. Buryan, Cornwall. The measured drawings are prefaced by a bold and effective but somewhat too hasty perspective drawing of the tower, which produces the impression to the eye that the main walls batter a good deal more than the measured elevations and section show. The tower is nothing but blank wall with a string-course at intervals, except for a single three-light window in each face of the upper story. It is one of the churches with three aisles of equal height, not uncommon in Devonshire and Cornwall; very low in proportion, with nothing showing on the side elevation but a single row of square-headed mullioned window; altogether a curious and characteristic church, and well worth illustration. Equally curious and characteristic is the rood in the church of La Martyr, Brittany, sketched by Mr. Cecil C. Brewer; a most singular bit of Renaissance work. On either side of the entrance to the chancel is a pedestal, carrying four colonnettes, one at each corner, which carry a bit of entablature like the top portion of a classic cornice with the rest cut off. On a blocking on each of these stands a figure, and an arched wooden beam springing from one to the other carries the crucifix in the centre.

Mr. Frank Green has produced a clever and effective title-page — a line drawing showing a columned alcove, between the columns of which is seen, below, a collection of some of the celebrated buildings of the world; at each end of the cornice a nude figure, with back to the spectator, sketches the buildings below. As symbolical of the objects of the Sketch-book it is a clever and effective architectural fancy.

THE ENGINEERING STANDARDS COMMITTEE.

IN our issue of March 14 some reference was made to the list of standard steel sections prepared by the Engineering Standards Committee, and our readers will be pleased to learn that arrangements have now been made for the publication of codified lists of all standards settled and to be settled by the Committee. In order that the usefulness of this publication may be more fully assured, it is intended to include in it complete lists of manufacturers and merchants who roll and supply standard steel sections for use in shipbuilding, in bridge and general building construction, and in railway work. Up to the present time only one series of standards has been settled—that relating to structural steel—but several others are to follow in due course, and the following summary of the scope of the Committee may be convenient for reference.

The existence of the Committee is the outcome of a suggestion made by Sir John Wolfe Barry, in consequence of which an Engineering Standards Committee was appointed by the Institution of Civil Engineers. This Institution then approached the Institution of Mechanical Engineers, the Institution of Naval Architects, and the Iron and Steel Institute with the view of securing their co-operation, and at a later date Sir William Preece proposed that the standardisation of electrical plant should be added to the sphere of the Committee's operations. Consequently, the Institution of Electrical Engineers was asked to co-operate with the other associations. Further, representatives of various Government Departments were invited to join the movement, and the Engineering Standards Committee as at present constituted became an accomplished fact. The five leading technical institutions are actively and financially supporting and controlling the operations of this important organisation, and as we have already announced, a Government grant of 3,000*l.* has been made as a contribution to the funds of the Committee for the year 1903-4. The Admiralty, who are one of the largest, if not the largest, users of rolled sections, have signified their approval in a most practical and valuable manner. Mr. Arnold-Forster, who throughout has taken a very keen and far-sighted interest in the work of the Committee, informed the House of Commons shortly after the publication of the first series of findings that the Admiralty had taken steps to give all orders for rolled material in terms of the findings. The loyal support of so important a Department as the Admiralty cannot but do much to hasten throughout the British Empire the adoption of the standard sections now settled. To the main Committee, which includes fourteen well-known engineers representing the five institutions already mentioned, falls the entire work of directing and organising the movement, and of finally approving the findings of the various Committees. At an early stage of the proceedings the main Committee sat to hear evidence on the advisability of standardising rolled sections before proceeding with the work. The evidence then brought forward was so overwhelmingly in its favour that Committees were formed to deal with the matter. Sir Benjamin Baker took charge of the Committee dealing with sections used in "Bridges and General Building Construction," Sir Douglas Fox of that dealing with "Railway Rolling-Stock Under-Frames," Mr. Denny of that relating to "Sections Used in Shipbuilding," and Sir John Wolfe Barry of that relating to "Rails." At the outset the three first-mentioned Committees proceeded independently of each other, deciding upon those sections which were necessary for the class of work referred to them. After repeated consultations various lists were drawn up, and joint meetings were then arranged in order to agree upon a series of standard sections to cover all requirements. The result of the joint meetings is seen in the list of standard sections now published.

The work of the Bridges Committee has been confined principally to drawing up a series of standard beams and tees, and to the consideration of equal and unequal angles, so as to meet the requirements of general building construction. Sections used in railway rolling-stock under-frames were considered by the second Committee, attention being given more particularly to channels and angles. The Committee on sections for shipbuilding is of a thoroughly comprehensive character, including representatives of the Admiralty, the Board of Trade, Lloyd's, the Steel Ingot Makers' Association, and, practically, of all the corporations and associations interested in shipping and shipbuilding. The sections more particularly considered by this Committee were bulb-angles, bulb-tees, bulb-plates, and Z-bars, the lists of ordinary sections used in shipbuilding having to be framed to meet the requirements of other Committees. Rail sections are divided for the consideration of two Sub-committees, one dealing with railway, and the other with tramway, rails. The first Sub-committee consists mainly of permanent-way engineers and representatives of leading manufacturers. This Committee is now engaged in drawing up a series of standards, and the second Sub-committee has already agreed upon a series of tramway rails which has been finally approved by the Board of Trade.

An important sub-committee is one formed for selecting tests for iron and steel material used in the construction of ships, and machinery used therein. This sub-committee includes the members of the committee on steel sections for shipbuilding, with the addition of members representing the mechanical aspect of the industry. Thus Sir John Durston has accepted a seat on behalf of the Admiralty, and Professor Unwin as the nominee of the International Association for Testing Materials of Construction. Other committees and sub-committees, under the chairmanship of Sir Douglas Fox and other engineers associated with traction, are now occupied with locomotives, their component parts and types, tyres, axles, and springs, steel boiler plates, and copper and its alloys. A Committee on Electrical Plant, with Sir William Preece as chairman, and sub-committees on electric generators, motors and transformers, temperatures of insulating materials, cables and conduits, and telegraphs and telephones, are considering the standardisation of appliances used in electrical engineering. A committee on screw-threads, with a sub-committee on limit-gauges, another committee on pipe-flanges, and one on cement, are engaged upon work the results of which will be greatly appreciated in engineering and architectural circles. The committee on cement is especially one from which much advantage may be expected. This body is under the presidency of Mr. W. Matthews—an engineer with considerable practical experience of Portland cement—and it includes the names of several well-known experts, such as Mr. Bertram Blount (Institute of Chemistry), Mr. Fitzmaurice (L.C.C.), Mr. Lyster (Liverpool Docks), and representatives of Messrs. J. Aird & Co., Messrs. S. Pearson & Son, Sir John Jackson, and of the Associated Portland Cement Manufacturers.

Finally we may mention the Committee for Publication and Calculation, under the chairmanship of Mr. Max am Ende, this committee being charged with the supervision of all matters relating to the publication of the findings, and the calculations required in connexion with the standard lists. The general control of finances is under the direction of a committee consisting of Mr. J. Mansergh, Sir Benjamin Baker, Sir John Wolfe Barry, Sir Douglas Fox, and Sir William Preece. From the above brief references it may be gathered how far-reaching is the scope of the Engineering Standards Committee as a whole, and some idea may be formed of the enormous importance of its work to the trade of the Empire at large.

NOTES.

Strikes and Lockouts.

WE recently commented on the Board of Trade return on wages, and the recent Report of the Labour Department on Strikes and Lockouts furnishes a pendant to the above, and is issued in a very interesting form. The aggregate duration of all disputes, new and old, during the year 1902, represented about three and a half million working days, which represents about half a working day a head over the whole working population, but three-quarters of the above took place in the mining and quarrying interests. There were 442 fresh disputes, affecting 260,000 workpeople, but the cessation of 16,000 pit hands from work threw 85,000 men out of employment. Thus, although the total number of stoppages was smaller than the average of the past five years, the number of workpeople affected was greater. The aggregate number of working days in each year for the whole industrial population being 2,600,000,000, the aggregate duration of disputes in 1902 was 3,479,255, or one day in 750. In the building trades the number of people directly and indirectly affected by disputes was 5,356, or 0·7 per cent., as compared with 9,797, or 1·2 per cent., in 1901; 19,178, or 2·3 per cent., in 1900; 30,524, or 3·7 per cent., in 1899; 16,684, or 2 per cent., in 1898. Of these disputes 40·09 per cent. were settled in favour of the workpeople, taking only those directly affected, 37·94 in favour of the employers, and 21·97 compromised; but, taking the disputes in all industries, only 31·60 resulted in favour of the workpeople, and this percentage is even less if those disputes are eliminated which arose between different classes of workpeople amongst themselves. The year 1902 compares very favourably with the four previous years, and another encouraging feature is the number of disputes arranged by arbitration and conciliation boards. The above figures do not include agricultural labourers and seamen, in which occupations no disputes have arisen, and if those classes of workpeople were added, the percentages of non-working days would be diminished in reference to the whole population.

London County Council Working Class Dwellings.

THE County Council last week adopted a Report of the Working Classes Committee. Assuming that the figures and statements in this document are correct, it appears to show that the London County Council cannot be adversely criticised in regard to the management of some at least of their blocks of working class dwellings. A comparison is made between the Turner and Ruskin Buildings on the Millbank Estate, and the Toronto and Montreal Buildings in Poplar, with those of the Liverpool Corporation in Victoria-square and Juvenal Buildings, and with seven estates belonging to the Guinness Trust. The result of this comparison gives as regards the cost of buildings per room the following result:—Liverpool, 93*l.* 10s. 4d.; Guinness Trust, 73*l.* os. 6d.; and London, 86*l.* os. 10d. According, however, to this Report, the London buildings are better than those in Liverpool. As regards cost of management this works out at 1s. 2⅜d. per room per week, and 1s. 4⅞d., these being for Liverpool, while the Guinness Trust shows 1s. 1⅛d., and London Turner and Ruskin Buildings 1s. 7⅜d., and Toronto and Montreal, 1s. 4⅝d. Under the head of "management" rates and repairs are included, and in regard to rates there are many differences between the different places which may account for the higher London expenditure on management. While we are not altogether in favour of municipal dwellings, it is necessary to admit that the principle has now been so much sanctioned that it must be regarded as settled, and, so far as this Report goes, it appears to show that London has not much to complain of with regard to the management and primary cost of its artisans' dwellings, though it is necessary to point out that the Report in question deals only with a very limited number of buildings, which can scarcely form sufficient data for a satisfactory comparison.

The Motor Traffic Bill.

THE Bill dealing with the regulation of motor traffic, as introduced in the House of Lords, seems both inadequate and incomplete. The declaration it contains against reckless and dangerous driving is an absurdity, since that is already within the reach of the law, and moreover abundant redress can be obtained by the common law by any one suffering damage. What is required is a clearly defined and easily applied law to this new development of high-speed traffic on the high road. Thus, when one person is put in a position of difficulty and danger by the action of another driving at high speed and leaving little time for action, the ordinary law of contributory negligence is inapplicable. This is recognised in maritime law, and a trifling mistake in judgment in the flurry of collision is not a bar, as at common law, to any claim for damages. The onus of proof or disproof should at least be placed on those using the public highways with high-speed and consequently dangerous vehicles.

L.C.C. Tramways.

THE Report of the Highways Committee of the London County Council on electrical traction for tramways is a carefully-prepared document, and gives a clear statement of the relative advantages of overhead and conduit tramways. They anticipate that the cost of constructing the conduit track for the Greenwich and Peckham lines will be higher than on the Tooting line, which amounted to 13,600*l.* per mile. Great difficulty was experienced in getting trustworthy figures either in America or on the Continent, but the average of the figures obtained was 16,000*l.* per mile. In outlying districts the cost was less than this, and in central districts it sometimes amounted to over 20,000*l.* per mile. In our opinion the great advantage of the conduit is the doing away with all the overhead wires in the streets. In addition, electrolysis of gas and water pipes is avoided. Now that the magnetic department of the National Physical Laboratory is removing to a remote part of Dumfriesshire, we do not think that the disturbance that an overhead system of electric traction would cause to the magnetic department at Greenwich or elsewhere is of any serious import. From a scientific point of view the magnetic records obtained in Scotland will enable Dr. Chree to complete his researches on the connexion between sun spots and magnetic disturbances just as well as if they were still recorded at Kew. Another probable advantage of the conduit system is that it will be more durable than the overhead wires. The great drawback to the conduit is the trouble of keeping it clean. The manager of the Compagnie Générale Parisienne states that the annual cost of cleaning the Paris conduits is 118*l.* per mile. This high figure is probably due to the fact that the Municipal Authorities only allow the dirt to be removed from the conduit at places at long distances apart. At Washington, where there is little traffic, means are provided at frequent intervals for removing the dirt and the annual cost per mile of track is only 5*l.* 10s. The manager of the London County Council tramways considers that the cost of cleaning the track in London will be about 100*l.* a mile.

Structures in Advance of Building Line.

THE Civil Service Co-operative Society recently erected a canopy or covered way in front of their premises in the Haymarket with an iron framework glazed over and tailed into the front of the building, projecting some 11 ft. The County Council took proceedings against them under the London Building Act (1894) in respect of this erection in advance of the building line, and the police magistrate convicted and made an order for its removal. The Society applied for a rule calling on the magistrate to state a case, but this has been refused by the Divisional Court on the ground that it was a question of fact. Section 22 of the Act provides against any "building or structure" being erected in advance of the building line unless with special leave. In the Building Acts a question has often arisen on what is intended by the word "building," and in some of the cases there are dicta to show that the word must be interpreted in its ordinary sense and includes any block of masonry or brickwork covered in by a roof; whereas, some text-book writers have considered the existence or absence of walls to furnish the test. Where, however, as in Section 22, any "structure" is also included (the word "erection" which occurs in the earlier Acts, having been omitted in the London Building Act, 1894), the matter seems free from doubt, and leave must be obtained for the erection of any projection unless it falls within the exceptions contained in Section 73 of the Act (such as bow windows, balconies, &c.).

Covenants, Licensing, Sub-letting.

AN important point to lessees has been decided by the Court of Appeal in the case of Young *v.* Ashley Gardens Properties, Ltd. (Current Law Reports). The plaintiff was lessee of a flat under a lease which contained a covenant that he should not sub-let or part with the possession of the premises without the license in writing of the lessor, which should not be "unreasonably or arbitrarily withheld." The defendants granted a license, but attached to it a condition making the plaintiff and, or, his assignee liable for any further increase in the rates, taxes, charges or assessments. The court held that the lessor had no right to impose a condition to the license, and that the plaintiff was entitled to assign without any further consent. In this case, it is to be observed, the landlord had not refused to give the leave required, assigning

no reason for his refusal, but had attempted to make his license subject to a condition, and this being the case, the court had jurisdiction to determine whether or no his consent was reasonably withheld. Had the landlord, however, merely refused, giving no reason for his refusal, the tenant would apparently only have had to assign at his own risk, that is at the risk of committing a breach of covenant and rendering his lease liable to forfeiture should it be proved the consent had been reasonably withheld.

Foreshore Protection.

THE inroads of the sea upon some of the eastern coasts of England have served to arouse a considerable amount of public attention, and the inhabitants of the Norfolk and Suffolk seaboard have already taken steps with the object of obtaining financial assistance from the Government towards the cost of protective works. A brief paper read by Mr. W. T. Douglas before the recent Engineering Conference contains some notes that are worthy of record on the subject of foreshore protection and the travel of beaches. The experience of the author agrees with that of other engineers, that beach travel is mainly governed by the flood stream. Consequently groynes should be arranged so as to arrest beach material on the flood-tide side. Their collecting capacity may be measured in terms of the length seaward, for, as pointed out in the paper, the tendency of a groyne is to encourage the shoreward motion of beach material previously travelling parallel with the shore. The most suitable angle at which to construct a groyne is stated at 95 deg. to the flood tide, or at 85 deg. from the shore. A useful warning is conveyed by the statement that "where the foreshore is short, it is not enough merely to construct a groyne between the cliff or sea-wall and low-water mark." When this practice is followed the almost invariable result is the formation of a channel at the end of the groyne, and the effect of such a channel is to pull the beach down into low water. Although short, this paper is full of valuable suggestions.

The "Bassin Loubet," Boulogne.

THIS important work, of which the foundation-stone was laid on Monday last by the French President on his way to England, will consist of a dock covering an area of some 16 acres, and affording more than 1,000 yards of quay room. The depth at low water will be 13 ft. 2 in. at the north side and 25 ft. at the south. The new dock will occupy a site to the north-west of the existing dock, on the Capeune Sands, and the battery at the shore end of the west pier has already been removed, while a new break-water, 720 yds. long by 80 ft. high, has been constructed in its place. Part of the shore end of the west pier, and the whole of the stockade will ultimately be removed, thus affording ample space for vessels entering or leaving the docks. Further improvements contemplated include the building of a new east pier in the place of the existing structure, so as to give better facilities for large vessels using the harbour; and the extension of the deep-sea harbour breakwater by some 650 yards, for the purpose of affording additional protection to the entrance to the inner harbour. The estimated cost of the foregoing works is 520,000*l.*, but those who are acquainted with the progress made in the shipping trade of the port will be prepared to admit that the money will be well spent.

Column Foundations.

As the foundations of a heavy building are sometimes the cause of anxiety, the following particulars, relative to the Government Printing Office, Washington, may be found both useful and interesting. The building in question is a fireproof structure of steel, brick, and concrete, supported by 178 steel columns, arranged about 12 ft. apart in six rows varying from 31 ft. 6 in. to 35 ft. apart. All the columns are seated on battered solid concrete piers carried down to a depth of 6 ft. or more below the basement floor, according to the conditions ascertained in each case. Preliminary tests of the earth were made by excavating pits inside cylinders, 6 ft. in diameter; timbers measuring 12 in. square were then placed vertically in the pits, and it was proved that loads ranging from 8 tons to 12 tons could be imposed without settlement. Hence, the safe bearing power of the earth was taken at 4 tons per sq. ft., but the foundations were designed with a bearing surface of 1 sq. ft. per 4 tons of dead load, and 1 sq. ft. per 3 tons of live load. The soil consists of sand, with some gravel and clay, and is saturated with water nearly to the level of the basement floor. Therefore, the foundation pits were sheeted, and wherever clay was encountered they were sunk down to clean sand, regardless of cost. Separate piers are provided for the columns, all being proportioned for maximum loads of 20 tons per sq. ft. at the top, and the sides are battered so as to provide at the bottom the bearing surface before mentioned. At least 12 in. of the lower part of each pier was made with parallel sides with the object of avoiding weakness at the toe. The spaces in the pits around the columns were filled with concrete, and the tops of all the main piers were finished flush with the basement floor, being capped with grillages made of steel I-beams, arranged so as to form rivetted pedestals, 6 ft. square, receiving the cast iron bases of the steel columns.

Sir Thomas Lovel and his Priory.

SIR CHARLES ROBINSON has presented a bronze medallion bust, surrounded by the Garter, of Sir Thomas Lovel to the Dean and Chapter of Westminster, who have placed it against the wall near the tomb of the Lady Margaret, Countess of Richmond, in Henry VII.'s Chapel. The bust, which is attributed to Torregiano, was formerly over the arch of the gateway of Old Harling Hall, built by Lovel at East Harling, near Thetford. Lovel's coat-arms within the Garter, and with "1518" on a scroll, carved in stone, are on the gatehouse in Chancery-lane of Lincoln's Inn. Lovel, knighted on the battlefield of Stoke, and installed a Knight of the Garter in 1503, played a conspicuous part in the victory at Bosworth; he was elected Speaker on November 8, 1485, and was Henry VII.'s Chancellor of the Exchequer, President of the Council, and Treasurer of the Household; he was also co-executor of that Sovereign and of the Lady Margaret. He was, moreover, a great builder and patron of the arts, and contributed to the building of Caius College, Cambridge; he served as Constable of the Tower, Steward of the Household, and in other exalted offices *temp.* Henry VIII.; as "double-reader" and treasurer to the Society of Lincoln's Inn he contributed largely to the building of the old gate-house there. Some members of his family were buried in the parish church of St. Leonard, Shoreditch; Sir Thomas Lovel built a chapel to receive his own monument on the south side of the church of the Halliwell Nunnery in that parish. The Priory of St. John the Baptist, to which he was a munificent benefactor, and which Stow says he rebuilt, had been founded for black nuns of the order of St. Benedict in the early years of the twelfth century; two of its charters of 1 and 6 Richard I. are transcribed in the "Monasticon Anglicanum," edit. 1823, vol. iv., 393. The adjacent Holy Well gave a name to the Priory, as also to the liberty and a prebendal manor of St. Paul's. Lovel died on May 25, 1524, at Elsyngs, his seat in Enfield; he bequeathed his town-house in Shoreditch to his nephew and heir, Sir Francis Lovel, of East Harling, and on June 6 was buried in his chapel at the Priory which, at the surrender in 1539, was valued at nearly 300*l.* per annum. What some considered to be his vault, containing two leaden coffins, was destroyed by the sinking of a shaft at the making of the middle-level intercepting sewer through New Inn-yard, by the late Metropolitan Board of Works in 1864. Maitland, 1756, mentions the ruins of the Priory as being extant in his day; they are plotted at New Inn-yard and King John's-court, together with the site, on the land of one Bateman, of the adjacent Holy Well, in Peter Chasserau's survey of the Parish taken in 1745. Within the precincts were established "The Theatre," the first play-house built in London, and "The Curtain," being the two public-houses named by Stow in the first edition of his "Survey," 1598. Having lately compared the several *data* on the spot, we gather that the Well lay close to the New Inn-yard, within the angle at the corner of the present Curtain-road and Bateman's-row — the "Ditch-side" and "Cash's-alley" respectively, of Chasserau's survey-map.

University College.

PROFESSOR SIMPSON has been appointed Professor of Architecture at University College. There could not well have been a better appointment. Professor Simpson has in a few years made Liverpool a centre of architectural education, and we are glad now to welcome him back to London.

The Architectural Association Day School.

MR. A. T. BOLTON, we regret to hear, has had to resign the mastership of the Day School of the Architectural Association, which he took up for a term of two years only. No one could have been better fitted to give a good start to such an undertaking than Mr. Bolton, who combines in an unusual degree artistic enthusiasm with practical knowledge. Mr. H. P. G. Maule, however, who has been appointed to succeed him, also combines practical and artistic knowledge, and from what we know of him personally, and of the thorough manner in which he goes into any subject that he takes up, we feel that the Association may have good hopes of the continued success of the Day School under his direction.

Leicestershire Society of Architects.

THE Thirtieth Annual Report of the Leicester and Leicestershire Society of Architects shows that the Society now numbers 106 members, viz., 11 honorary members, 45 members, 14 associate members, 26 assistants, and 10 pupil members, an increase of two since the last Report was issued. The Report is a highly creditable piece of typography (a matter to which we observe that provincial architectural societies now pay a good deal of attention), and it appears that some very good papers were read during the Session; but one regrets to see a paragraph to the effect that the attendance of members on these occasions is decreasing, and has been recently so small that "unless the members can be induced to show more appreciation the Committee feel that these lectures another session will have to be discontinued." The Society seems to be gradually forming a fairly good architectural library, though we do not think that such very amateur books as Leader Scott's "Brunelleschi" are worth adding to an architectural library; and we may ask, who corrects the press of the library catalogue? It is rather surprising, in a catalogue issued by an architectural society, to find the well-known name of Viollet-le-Duc figuring as "Violet Le Duc."

Lithographs of Old London.

A VERY interesting collection of lithographs of old houses and portions of old streets in London is on view at Clifford's Inn. The drawings are by Mr. Thomas R. Way, and are proofs of illustrations to various books, "Reliques of Old London," "Later Reliques of Old London," and others, several of which have been noticed in our columns at the time of publication. There are 187 lithographs, besides about a dozen and a half of pastel drawings which are added to make a little variety in the exhibits. Mr. Way observes that though his series of illustrations was only commenced about twelve years ago, yet a considerable proportion of the buildings drawn here have already disappeared, and others are only awaiting their final sentence. Among the best or most interesting of the illustrations may be mentioned "55 and 56, Great Queen-street" (6); "Old Gateway, Chancery-lane" (9); "Clifford's Inn Hall" (11); "Field Court, Grays' Inn" (20); "Christ's Hospital, Entrance Doorway" (22); Back Court, E.C." (25); "6 and 7, Aldgate" (33), with their decorated pilasters; "The Vine Tavern, Mile End-road" (38), showing the characteristic entrance to the Trinity Almshouses, which are also the subject of another drawing (37); "The Great House, Leyton" (44); the old "Highgate Archway" (47), much more picturesque and architecturally effective than the new arch which has taken its place; "The Brockley Jack, Brockley" (58), an example of an old wayside country tavern; "High Bridge, Greenwich" (65), showing some curious old timber houses; "The Harbour Master, Limehouse," (69), a riverside inn, with the boats on the beach beneath it; "413 and 414, Strand" (87); "The Greycoat School, Westminster" (93); "16, Cheyne-walk" (99); and "Old Kew Bridge from Strand-on-the-Green" (113). The collection also includes some illustrations of the Halls of the City Guilds—these, we hope, are not to be regarded as doomed, unless indeed the Companies deliberately rebuild them. Among the best of these are "The Entrance to Mercers' Hall" (147), with its columned loggia; the "Cedar Room" and the staircase, Skinners' Hall (153, 154); the Hall and the Staircase, Merchant Taylors' Hall (155, 156); and "The Garden, Stationers' Hall" (170), with its one large tree in the centre. The collection will be on view for a week or two from now, and those interested in Old London should not omit to visit it. We ought to be much indebted to Mr. Way for the industry and ability with which he has produced this valuable series of records.

MAGAZINES AND REVIEWS.

IN the *Magazine of Art* the review of the Royal Academy pictures is continued, and we are glad to see so full a recognition of Mr. Hemy's picture "Youth," which, the editor says (and we entirely agree with him) "excels in its own qualities everything that has been seen in this country before." Mr. Spielmann continues his general survey of the subject of "Art Forgeries and Counterfeits," dealing in this issue with bronzes, medals and coins, gesso duro, and ceramics, and giving many curious details both as to the methods of the forger and the methods of detection. An important article is that by Colonel Plunkett on "How an Art Museum should be Arranged." The main question which the author takes is that of method of classification, concerning which he observes that two principal methods of classification may be recognised—that by material employed, and that by countries or periods to which the works belong.

"By the former system different divisions or apartments of the museum would be devoted to stone carvings, ivories, furniture, enamels, bronzes, leather work, and so on; while by the latter arrangement we should group together all the works of one period or school, say the Italian cinque cento, the French thirteenth century, or the period of Louis XIV., or of Louis XV., of whatever material the objects may be made."

Colonel Plunkett decides unhesitatingly in favour of the latter system, and we think he is right, though the question is not so simple or decisive as he seems to consider. In studying the development of any one class of article, for instance, it is a distinct advantage to have the specimens, of all dates, grouped together. But on the whole the superior advantages are on the side of the epochal grouping, since the styles of design in different classes of objects of the same country and period have a relation to and to some extent explain each other. But the author suggests a block scheme for a museum in which both these aims might be fulfilled, by classifying countries in parallel lines in one direction, and classes of objects in parallel lines at right angles to these, each class running in a straight line through all the country divisions. It looks beautifully symmetrical on paper, but might be difficult to carry out in reality, since some types of objects are not found in all countries, or they are numerous and important in one country and scarce and unimportant in another. However, the suggestion is a good one in its broad lines, and the article is worth attention.

In the *Art Journal* an article under the title "An Artist in Tunis" serves as framework to a series of admirable sketches and studies by M. Brunet-Debaines. The frontispiece, "The Mosque Bab-Dzira" (an etching), and the full-page plate "Souk-el-Halfouine," (a reproduction from a water-colour), are remarkably fine; and the smaller sketches are also of most artistic quality. Mr. Cundall's continuation of the article on "Charles Kean and Theatrical Scenery" is illustrated by examples of scenic effect in which architecture plays an important part, which are certainly very good examples of stage scenery, though there is about nearly all of them that indefinable *soupçon* of claptrap and unreality from which the painters of stage architecture seem never able quite to escape; there is always something cooked, something which is not quite right, about the architecture. The most real of those illustrated is Telbin's "Rialto and Grand Canal." "The Boar's Head and Eastcheap" (Dayes) is good as a picture, but the houses are too tall and the street too wide to convince us of its reality as a London street scene of the supposed period. "The Hall of Nimrod" (Lloyds), for Byron's "Sardanapalus," is a good example of the effective stage trick which, we believe, Charles Kean first suggested, of showing the vista of the vast hall obliquely, so that it vanishes out of sight, and the spectator is left to supply in his imagination the perspective extent of the scene. The contrivance is admirably carried out in this design, but it is a very stagey Ninevitish architecture. The painters illustrated in two articles are Goya and Jacques-Marie, the latter by reproductions of one or two pictures lately seen at the Goupil Gallery. The talent of Goya comes out to more advantage in black and white than in the original pictures; which is not surprising considering his own dictum, that "in nature exist no colour and no lines; nothing but light and shadows." He is a painter at present very much overrated; one of the recent fashions of dilettantism.

In the *Architektonische Rundschau* the illustrations are better in execution than the designs they illustrate; the photographic reproduction of the "Wohn-und-Geschäft-haus" at Hagen—a street front of shops and flats, by Herr Kessler, is quite remarkable in the brilliancy and force of the reproduction, but the design itself has little to recommend it. A chromo-lithograph of a circular memorial tower in red brick, rising from a stone terrace and arcade, is an excellent specimen of colour-printing, thrown away upon a tawdry and pretentious piece of architecture. None of the other illustrations of new buildings are of any architectural interest; but the article on mediæval timber buildings in the North of France is well illustrated.

The illustrations of the *Berliner Architekturwelt* this month are chiefly selected from exhibits in the Berlin art exhibition of the year, the architectural designs being mainly competition projects. Some of the photographs of *ensembles* of room furniture and decoration are interesting, and among the few architectural illustrations of actual buildings, or buildings presumably to be carried out, Herr Kuhlmann's church for Münster am Stein shows a simple and effective stone building which suits well with its mountain background.

The *World's Work* includes a short article on "Trams without Rails," the system otherwise called the "rail-less tram" or the "trolley motor," in which no rails are employed, but there is a second wire to return the current to earth, as well as the ordinary overhead driving wire. The contact is arranged so as to allow a play of 10 ft. on either side of the wires, within which limits the cars can be steered to pass other vehicles. This is the system the threatened introduction of which in Paris has recently been so violently and successfully opposed. It appears to us to have absolutely nothing to recommend it, and is only calculated to make the introduction of electric-wire traction in crowded streets the cause of confusion worse confounded. In the same number is an illustrated article on the work of Mr. Solon Borglum, an American "Wild West" sculptor (with certainly a thoroughly "Wild West" name) who has made an original success as a sculptor by simply modelling prairie horses and other animals as he saw them. We confess that we had not heard of Mr. Borglum before, or at all events did not remember his name or works, though it appears that some of his works obtained acceptance at the Paris Salon and elicited the approval of M. Frémiet. The illustrations given with the article show unquestionably original genius and power of observation, though he does not seem to have arrived at anything like style in sculpture.

In *Knowledge*, under the heading "Modern Cosmogonies," Miss Agnes Clerke has an article on the present condition and acceptance of Laplace's nebular hypothesis, which more modern astronomic thought and methods seem almost to have improved out of recognition. The article which, like all Miss Clerke's writings, is very close reading, forms a summary of the views on this subject of various scientific minds since Laplace's day. Two interesting points in it we may notice: the one is Kirkwood's conclusion (1884) that planets and comets have not been formed from rings of matter, but rings from planets and comets; a conclusion which certainly seems to have a practical bearing on the phenomenon of the rings of Saturn. The other is the theory of Roche, of Montpellier, known as "Roche's Limit," to the effect that a satellite cannot revolve round its primary and

maintain a globular form at a less distance than 2·44 of its mean radii, owing to the stress of tidal forces, except under improbable conditions of density. It is observed that all the moons so far discovered in the solar system do revolve outside Roche's limit, and that Saturn's rings, which revolve within it, may owe to that circumstance their pulverulent condition. This seems however, rather arguing in a circle, since the pulverulent condition of the Saturn rings (which is only a matter of reasoning and not of observation) has been assumed on account of the impossibility of imagining their stability under any other condition. And then, if Roche's theory is accepted, what becomes of the modern theory as to the moon having been at one time revolving almost in contact with the earth; and what was the shape and density of the moon at that period? These seem to be questions growing out of the argument. Mr. C. Easton follows with an article, "What is the Milky Way?"

The *Antiquary*, naturally and rightly, at the present juncture, offers us an article on "Battlefield, Salop," by the Rev. W. G. D. Fletcher, the Vicar of St. Michael's Shrewsbury, and a Fellow of the Society of Antiquaries. He includes in his article a description of the interesting church, of which some illustrations are also given. Miss Alice Doré contributes an article on St. Martin's, Canterbury, and the Rev. Dukinfield Astley one on "A Ramble round Thetford." We share his regret that the old Guildhall should have been pulled down, and perhaps still more that it should be in course of being "rebuilt on the old lines," a process the usual result of which is to lose both the convenience of a larger and better-planned modern building and the antiquarian value of the ancient one. He does not say anything, however, of the reasons for its demolition, which may have been practical and unanswerable. One must look on both sides of the question in these cases, which antiquaries are often not very ready to do.

In the *Nineteenth Century* Mr. Ernest Rhys writes an article on "The Masques of Inigo Jones," regarded as indications of what Jones would have liked to do in permanent architecture, had he found the opportunity. The comparison must not be pushed too far, but there is something in it. Inigo Jones was doubtless a typical example of the architect as described by Pugin—a person who is always imagining great things and having to execute little ones. The Whitehall Palace design, Mr. Rhys suggests, was in its complete form the natural counterpart of those fugitive temples and palaces of a night with which he dazzled the courts of James I. and Charles I. In saying, however, that it would have been carried out "on a base larger than that of the present Houses of Parliament, and with a result infinitely finer in the completed design," the author is going too far, and shows the usual insensibility of Englishmen to the real greatness of Barry's building. Mr. J. Milnes Gaskell, the chairman of the West Riding Rivers Board, contributes a noteworthy article on "The Pollution of Our Rivers," with statistics as to the condition of some of them in his district, and as to the attitude and action of the "Yorkshire Mill Owners' Association" in polluting the rivers and in opposing any schemes of reform, which ought to have serious attention. Sir Oliver Lodge contributes a short article on "Radium and Its Lessons;" the lessons referring to the new light which may be shed, by the action of radium, on the obscure questions of the construction and behaviour of atomic matter, on which he suggests that there is now an opportunity for some new investigation.

The *Century* gives, as a frontispiece, a fine wood engraving by Mr. Timothy Cole of Velasquez' imaginary portrait of Menippus, in the Prado Museum, Madrid, in which Velasquez transformed a Greek philosopher (or anti-philosopher) into a Spaniard. As usual, Mr. Cole's work is an admirable example of style and texture in wood engraving.

In *Macmillan* there is an article by Mr. Laurence Gomme, "Aldwych in London," which should be read by all who are interested in the early history of London. The main subject of the article is in reality the history of the site and neighbourhood of St. Clement Danes, and it goes to show the probability that the Danes had actually a settlement here, just without the then walls of London. Miss A. S. Galbraith contributes an article on "The Handicrafts" which is marked by exceptional impartiality and common sense. That Miss Galbraith stands quite apart from the Utopian views of Ruskin and Morris as to the necessarily debasing effect of work done by the aid of machinery is obvious from the following passage:—

"As to the idea still prevalent among the disciples of Ruskin, that hand work is in itself a happier, better, and more moral thing than machine work, if this once be granted, then we must abolish every implement, for how can a line be drawn? If a needle be allowed with which to draw the thread, then why not a rod to push the needle? If we may save labour by using a spade, then why not a plough? And if a plough be used then why not a horse to pull it, and if a horse, why not a steam-horse? And wherein lies the greater nobleness in wearing out human flesh by pushing a hand-plough, than in guiding a steam-plough? I have stood in a huge factory and watched a man manipulate a steam-driven loom in the most wonderful way; and I have stood beside a hand-loom in the far north, and I confess that, although at that time a believer in Ruskin, still I could not see the greater nobleness in painfully kicking at the loom with one's feet, and laboriously throwing with the hand a shuttle which a machine could thrown quite as well. Nor in their private lives could I ever discern that those who worked at the steam-driven looms were in any degree more 'debased into leathern thongs' to yoke machinery with than those who strained at the hand-loom. Wherein lies the higher morality in employing human beings to do the heavy work of the instruments, as in hand-ploughs or hand-looms, and why should this be nobler than doing the lighter work of mere coupling or guiding, as in great factories?

As for the greater happiness, ask the Harris tweed weaver of his happiness, or the makers of lace curtains, working at the hand-looms in their icy cellars in Switzerland. It will not be found to exceed that of the mill-workers."

Nevertheless, the writer is quite alive to the superior beauty and interest of handmade artistic work, and the wisdom of permitting those who have the gift for artistic production to produce individual work in their own way. But even in regard to this there is an amusing caution given as to the attitude frequently assumed by the handicraft artists of to-day, as if they were a superior order of beings to be sought out and courted for their work.

"Many could and would buy much more largely if they had facilities for doing so, and if, one must add, artists would put away their false pride and condescend to behave like business men. They make their wares, they want to sell them, but they are terrified at the mere thought of being mistaken for tradesmen. To sell a picture in the studio is good, to employ an agent is permissible; but to put their work in the desecrating hands of a good furnishing warehouse is philistinism. Yet it is an undoubted fact that, once the work passes out of the maker's hands, it is quite likely to be placed (and that permanently) in surroundings as unsuitable as any window in Tottenham Court-road. But it is to be feared that, until some steps are taken to keep the entire work of the artist community before the public, little support is to be looked for from that practical body. For how can people buy things when ignorant of their existence? Do artists really expect that they are to sit in state for ever, while folks come long journeys and beg humbly for permission to inspect their work, or wait patiently for a year between each exhibition to buy a new article."

That is a frank expression of the truth which will make some people very angry; but it is not the less truth for all that.

Scribner, under "The Field of Art," devotes a short article, by Mr. E. H. Blashfield, to the subject of "The Rehabilitation of Pinturicchio," from which we gather that a Pinturicchio craze is to follow the Botticelli craze. There is nothing crazy in the article, however, which is a very fair and critical summary of what Pinturicchio could and could not do. A short article on "The Cedars of Lebanon," illustrated by photographs, is interesting both from the historical and biblical associations with these ancient trees, and the description of their character and apparent great age and vitality.

In the *Gentleman's Magazine* Mr. George Cadell writes a short but strongly expressed article on "British Forestry," or perhaps rather on the want of it. His argument goes to show not only that we are neglecting a source of wealth in the value of the timber itself, but that the value of agricultural land is increased by the neighbourhood of wooded country; in other words, that agriculture and forestry rise and fall together. The following is one instance given of this:—

"The cultivation of the maritime pine, *Pinus pinaster*, in the Landes is an enterprise not yet fifty years old, for it was not till after the Paris Exhibition of 1855 that it was seriously entered into. To-day the district is celebrated not only for a special breed of cattle, which was originally imported from Brittany, but for the excellence of its vines which rival those of the Gironde.

It may be said that this was a Government undertaking. In reality it was a joint enterprise entered into by the Government, the Communes, and the private proprietors. Here is the example of a private individual whom the writer has personally visited.

Mr. X., a retired Anglo-Indian, obtained land for planting operations in France in 1870-71. His work was temporarily suspended by the Franco-German war, owing to the inroads of the Uhlans. But it was afterwards resumed, and to-day he has large and thriving plantations, with a forest nursery of wide reputation. The land in his neighbourhood has so benefited by his own and similar undertakings that the district, formerly almost a desert, is now one of the most attractive of the country, as well for residence as for sport, and the Order of Merit for Agriculture has been deservedly bestowed upon the pioneer planter.

There is no reason why both Government and private proprietors should not in their respective spheres achieve similar results in this country. But they must work seriously as well as in unison."

Temple Bar contains an article by Mr. W. R. H. Trowbridge "From Paris to London by Water," the interest of which lies partly in the fact that this is a trip that cannot at present be taken by any passenger for hire, the goods boats which go from Paris to London quaysides, by way of the Seine, not carrying any passengers, and the author was only taken as a favour and after a good deal of diplomacy. Below Rouen, indeed, there are passenger boats, but between Paris and Rouen the trip along the winding loops of the Seine was an entire novelty. It is very picturesquely described.

THE INTERNATIONAL FIRE CONGRESS.

ON Monday morning, in the Empress Theatre, Earl's Court, an International Fire Prevention Congress was opened by the Lord Mayor (Sir Marcus Samuel, Bart.) in connexion with the International Fire Exhibition. Several Mayors of provincial towns attended in their robes and chains of office. The Lord Mayor was attended by Sheriff Sir George Truscott and Sheriff Sir Thomas Brooke-Hitching in Civic State. The company included Lord Windsor (First Commissioner of Works), Hon. T. Cochrane, M.P. (Home Office), Prince Alexander Lvoff (representing the Ministry of the Interior, Russia), M. Lépine (Prefect of the Police, Paris), Mr. E. O. Sachs (Chairman of the British Fire Prevention Committee and Vice-President of the National Fire Brigades Union), Privy Councillor Stübben (late City Architect, Cologne), Chief Officer Giersberg, Royal Police, Berlin (representing the Ministry of the Interior, Prussia), Chevalier Goldoni (representing the Ministry of the Interior, Italy), Mr. C. Hexamer (President of the National Fire Protection Association, United States), Alderman Sir William Treloar, Sir William H. Preece, Count Szechenyi (Hungarian Fire Brigade Union), and others.

The Lord Mayor, in extending to the delegates a warm welcome, spoke of the necessity for co-operation among engineers, architects, municipal officials, and fire brigade officers, in order to fight that cruel enemy of mankind—fire. He impressed on those present how careful public authorities should be in the selection of the *personnel* of a fire brigade, and especially of those whom they placed over the men. London had been very fortunate in the heads of its fire brigade.

Lord Windsor associated himself with every word the Lord Mayor had said in expressing the cordiality with which he welcomed every gentleman present that afternoon. It was not to be expected that every nation would regard all questions—political and international—from the same point of view; but nothing, he was certain, could tend more to remove their differences, if there were such differences, than free and friendly intercourse on all matters relating to art and science and industry and commerce. They were grateful to those who had come from a great distance to join in the Congress, which he trusted would be of benefit to the whole world, and that the interchange of experiences might be of permanent value to the communities represented.

The Hon. T. Cochrane, M.P., spoke of the importance of finding out the best means of fighting an enemy which in a few minutes destroyed the labours of a lifetime. What could be obtained was fire-resisting

material in greater or less degree. It was desirable that the legal status of the fireman should be raised, and he was glad to see among them Mr. Guy Pym, M.P., who was taking steps in that direction. There had not hitherto been that connexion which there should be between professional and volunteer firemen, and he believed one result of that meeting might be a better understanding between them. They and representatives of all nationalities might be led to join in one central bureau. Warnings against accidents by fire through playing with matches and so on might be popularised, as they were in Sweden, in schools and elsewhere.

Mr. E. O. Sachs, Chairman of the British Fire Prevention Committee, in the course of an address to the members of the Congress, pointed out that never before in this country had a gathering been held at which architects, engineers, fire surveyors, municipal officials, legislators, and insurance officials had met to take counsel with fire brigade chiefs and salvage corps officers. It was only of recent date that a few of the leading members of the British fire service had awakened to the fact that a fire brigade officer's work not only consisted in extinguishing fire, but must, to a great extent, include a sound knowledge of precautionary measures. The Fire Prevention Committee was founded at the time when the terrible loss of life at the Paris Charity Bazaar in 1897 still haunted the public mind, and the enormous destruction of property in the Cripplegate area in London made so deep an impression at home and abroad. He advocated a standardisation of fire resistance for practical purposes, and condemned wrongful trading on the term "fireproof." He trusted that the Congress would bring some influence to bear upon the exclusion of the word "fireproof" from the vocabulary of the English and American nations, as the word was a misnomer. He suggested that the word "fire-resisting" should be substituted.

M. Louis Lépine, speaking in French, expressed his pleasure in taking part in the Congress, and at seeing present so many distinguished men from all parts of Europe. Great improvement had been made in Paris in fire calls, which enabled them to deal more effectively with fires.

On behalf of the President of the French Republic, M. Lépine then presented a diploma of honour and a medal to Mr. E. O. Sachs, Lieutenant-Colonel Fox (Chief Officer, London Salvage Corps), Mr. Horace G. Folker (Secretary, National Fire Brigades' Union), and to Mr. C. Brasier, Chairman of the London Private Fire Brigade Association.

Speeches were then made by Prince Lvoff, Herr Stübben, Chevalier Goldoni, Mr. Hexamer, U.S.A., Sir. W. H. Preece, K.C.B., M. Metaxas, Greek Minister, and others.

After luncheon the official delegates and visitors saw the realistic representation in the Empress Theatre of "Fighting the Flames," and visited other places of interest in the Exhibition. At night a formal inaugural reception was given to the delegates by the Chairman and Executive of the British Fire Prevention Committee in Caxton Hall, Westminster.

On Tuesday morning at Caxton Hall, Westminster, the members of the Congress assembled at ten o'clock, Mr. E. O. Sachs presiding.

Prevention of Loss by Fire in the United States.

After making several announcements to the delegates in French, German, and English, the Chairman said that a paper had been prepared by Mr. Edward Atkinson, LL.D., Ph.D., President of the Boston Manufacturers' Mutual Fire Insurance Co., Boston, Massachusetts, U.S.A., on "The Prevention of Loss by Fire in the United States of America." Mr. Atkinson, who was one of the greatest authorities in America on the subject of fire prevention, had intended to be present to read the paper, but on account of bad health he would not be able to attend. Mr. Gray, of Boston, however, had kindly undertaken to read it on his behalf.

Mr. Gray then read the paper, the greater part of which we print, as follows :—

The problem presented to the underwriters of the United States and to the community as a whole, is totally different from any problem that could be found in any European country, especially in Great Britain. First, the climate or climates of the United States vary from those of Europe in matters that have an important bearing upon the construction of buildings. In this essay I will omit the conditions of the extreme South and of the extreme North, dealing with the great section which extends from the Atlantic to the Pacific, between parallels of latitude 35 deg. to 45 deg. N. In this section will be found the larger part of the population, the greater number of factories and workshops, the principal cities and public buildings, and by far the greater number of the public school buildings in which the sessions of the common free schools are held. Within this section there are very great variations between summer and winter, the common range of the thermometer being from 30 below zero Fahrenheit – (34 deg. C.) — sometimes lower—to 90 Fahrenheit + (32 deg. C.), and sometimes higher. There is also a great variation in the constant of humidity. On the whole the entire section may be considered dry as compared to the average of Great Britain until we reach the extreme western coast, where the climate of Oregon and Washington more nearly resemble the humid climate of Great Britain.

The next variation from European conditions is to be found in the huge abundance of timber, both resinous and hard wood, and the relative scarcity of good building stone in the earlier period of the history of the country. As yet no building stone has been discovered corresponding to the stone which is so much used in France and Belgium, which can be cut and carved like cheese, but hardens like iron on exposure to the atmosphere for a short period. It therefore happened that the best material for the construction of dwelling-houses in the early stages of the growth of towns and cities, and throughout the country districts, is wood, disposed in a suitable manner and properly finished within and without, rather than brick or stone. It is also true that when these latter materials are used in the ordinary way, that is, without excess of cost in building thick walls with air spaces in the walls to prevent ill effects of cold, heat, and dampness, they are alternately affected by heat, cold, and dampness in excess, from which properly constructed wooden buildings are free. In the extreme cold of winter brick and stone walls become chilled, presently gathering humidity from the atmosphere within the dwelling or building, making the house very damp and difficult to heat; whereas, in the hot summer, brick walls heat very rapidly and become intolerable unless expensively constructed with air spaces. On the other hand, wood is well known to be among the best of the non-heat-conducting mediums, and when disposed in thick sections of heavy mass the building of wood or timber, with properly constructed roof, is warmer in winter, cooler in summer, more easily heated and ventilated, and in every way a more sanitary building than any other kind yet devised except at very heavy relative cost.

The typical dwelling of the early settlers was therefore the log cabin, the most comfortable and suitable dwelling that could have been devised or constructed at any moderate cost within the means of the early settlers. The next typical dwelling-house, built by the richer citizens when the various colonies began to prosper, was constructed in what is now known as the Colonial style by well-trained mechanics who brought their conceptions from England. In the early period these dwellings were constructed of oak timbers, heavily framed, covered in with very thick boards, nailed on with wrought-iron nails; often filled in between the wood and the inner plastering with brick and then finished in a very solid manner, often, in principal rooms, with panels of the Old English style. These broad, well-proportioned, Colonial houses left nothing to be desired in comfort, convenience, and safety at the standard of that period and under those conditions. Many still exist, some of them over 200 years old. One part of one of them in my own town is about 250 years old. After passing through a great variety of stages of very bad design, the best architects of the country are now bringing their clients back to this old Colonial type. It is restful to witness the increasing number of these dwellings scattered around amid the crazy roofs and bad imitations of European styles with which so many of our towns and cities are infested.

This solid method of construction, both of town and country buildings, however, gave place to a very dangerous type of building from the underwriter's point of view, when the circular saw was applied to cutting up the solid timbers into plank, joist, and scantling of various kinds, which have been put together in what has sometimes been called basket-framing, leading to the construction of buildings of a cellular type; the light frames being put together in such a way as to be very firm and strong by bracing and boarding on the outside, or covered in by brick walls in cities, the plastering within on wooden lath and placed on the face of the inside of the frame; partitions constructed in the same way and floors of the same kind, so that the result is a building pervaded with cells of wood very difficult to cut off from each other, communicating with a hollow ceiled roof of the same type of construction, so that the largest possible loss by fire is assured from the least possible cause.

The change which has been brought about in factory construction, under the influence of the Factory Mutual Underwriters, has not been in giving up the use of wood or in any effort to construct fireproof mill or workshop; but in reverting, one may say, to the heavy timber construction of the colonial period, and the disposal of plank and timber within brick or stone walls in such a way that there may be no concealed spaces through which fire may pass out of reach of water. In that way, and by evolving suitable safeguards and means of protection, the whole system of constructing the textile factories, paper mills and workshops has been rendered safe and suitable. The losses by fire within the risks which are under the supervision of the Factory Mutual Underwriters have been, in the older companies, for fifty years, less than fifteen cents per year on each hundred dollars (·0015 per centum) of insured property; and during a period of more than seven years the losses within these risks have been less than four cents per year on each hundred dollars (·0004 per centum) of insured property, or about one-fifteenth part of the loss on insured property outside their range. Their influence is now pervading sections of the country which it has only lately reached, and a profound change is coming over what may be called industrial architecture, since the prevention of loss by fire in factories and workshops of slow-burning construction has been made an applied science, of which the rules and practices are easily mastered.

Having drawn attention to the different conditions which govern architecture and building in the United States, as compared with European States, we may now take up other conditions. It would have been a misfortune had the people of this country adopted more durable methods by constructing city buildings, factories, and workshops of a more permanent kind than they did construct; such buildings would have been, of course, at a much heavier cost, they would have become an encumbrance upon the land, and yet of such solid construction that they might have been incapable of being converted to the right use of modern mechanism. It is only about thirty years ago that a most skilful and competent mill engineer, under whose supervision some of the largest textile factories had been constructed, made the remark that it was not judicious to plan any factory building for a duration of more than twenty-five years, except as to the foundations. Had he made that remark a few years later he would not have excepted the foundations. The textile factory and many other industrial buildings constructed fifty years ago were not over 50 ft., often less, in width, and some of them were eight or nine stories high. The next type was a factory or workshop 60 ft. in width, five to six stories high. Neither type of building is fit for modern conditions, and no person could run modern machinery with any profit whatever in the old type of narrow and high factory building. The modern textile factory is seldom more than three stories in height for carding and spinning; one story for weaving. Whenever there is room machine shops are built of one story, and many other industrial buildings are now being constructed in a similar way. The diffusion of light by ribbed or prismatic glass assures an even daylight over very wide areas, with freedom from glare near the windows.

These rules and methods of slow-burning or mill construction and for the diffusion of light are now being established throughout the United States beyond the area of the influence of the Factory Mutual Fire Insurance Companies, by the distribution of documents from the Insurance Engineering Experiment Station now beginning its work under the direction of the writer. Examples of these documents are sent herewith.

We may now take up the growth and construction of towns and cities. In that, again, a rapid construction of wooden buildings for temporary use has been and still is necessary for the housing of the population. Throughout the middle and the far-west, where public lands have been disposed of in quarter sections of 160 acres each, towns have been planned on rather a grand scale with a view to future growth into cities. In very many cases that growth has been attained within a very short number of years. The first buildings, hastily constructed of wood, soon give place to a better class, and if the town grows, a wider area may be covered with wooden buildings detached from but very close to each other, the only conspicuous building of a durable kind being the public common schoolhouse, for the construction of which reservations have been made from the public land. Presently the detached wooden buildings give place to brick blocks of a more permanent character, and yet not suitable for any very long duration. In the older cities of the East, narrow streets may be bordered by alternating very old wooden buildings and modern structures, safe or unsafe as the case may be.

Hence comes the necessity for very completely organised and efficient fire departments, and yet occasional conflagrations occur; witness the great fires in Chicago and Boston. These conflagrations were not unmitigated evils. They were disastrous to individuals and to part of the insurance companies, but they cleared away a great ruck of unsafe and unsuitable buildings, made the way for re-adjusting lines of streets; and both in the end worked improvement in the cities at the cost of the individuals who suffered. The Boston fire, however, did not discrimate wisely. It approached quite a large section of old and dilapidated buildings, occupying land leased nearly 100 years ago upon a ground rent—this lease so near its termination that it is not for the interest of the owners to remove these old buildings, but to get all they can out of them, so that they remain a blot and menace in the centre of the best business district. Had the Boston fire exerted sufficient discrimination to cross a street and to wipe out that section on the leased land, it would have been a yet greater benefit to the City of Boston. These long ground rents are very uncommon. They are now prohibited in many States, and where they exist are obstructive to the public welfare.

It thus happens, that what may be called unsafe methods of construction, have been both necessary and expedient in the progress of the development of the country, and that more permanent buildings, which would have absorbed a much greater part of the small capital available, would have been an encumbrance rather than a benefit. The methods of construction of the country have therefore adapted themselves to the materials, to variations in climate, and to conditions of growth. True types of architecture, like the old colonial dwelling, have occasionally been evolved, while very many bad types have been practised in the effort to import architectural designs and methods from European schools, and to work them into buildings for which they were unfit. Again, American architecture in cities is now being diverted from true lines of development and of art by the construction of self-supporting steel-framed buildings of many stories in height, commonly called sky-scrapers, to which a few words will be given later.

Such being the quality and the conditions of the general average of industrial buildings, shops, warehouses, &c., constituting 95 per cent. of the insurable value of property in the United States, outside the lines of the Factory Mutual Companies, what are the conditions to which the prevention of loss by fire can be applied? They are either the incapacity of architects and builders to apply conditions of safety to the construction of ordinary buildings, or the yet greater incapacity and unwillingness of owners to change from the bad methods, even at the instance of an intelligent architect. Faults are committed and re-committed by owners which might be remedied without increase of cost, and very often at less cost, if it had not become the habit of owners and occupants to consider their duty ended when they had negotiated a policy of insurance covering whatever risk, often avoidable at a lessened cost, they might chance to commit. The next element of danger is the gross and criminal carelessness of the occupants of such insured premises.

The ash heap of the United States averages one hundred and fifty million dollars ($150,000,000 = 30,000,000*l.* sterling) a year, two-thirds of which is due in about even proportions to the inattention, incapacity, or negligence of owners, occupants, builders, and architects alike. Or, to put the case in another way, the ash heap, averaging one hundred and fifty million dollars ($150,000,000) a year, which might easily be reduced by one-half; excess of premiums and heavy cost of insurance, amounting to at least eighty million dollars ($80,000,000 = 16,000,000*l.* sterling) a year; the excess of water supply and cost of fire departments, which may be estimated at twenty to fifty million ($20,000,000 to $50,000,000 = 4,000,000*l.* to 10,000,000*l.* sterling) more, makes the aggregate remediable excess of cost of fires in the United States at least two hundred million dollars ($200,000,000=40,000,000*l.* sterling) a year, all of which may be saved. This may be attributed mainly to the restless energy and severe work given to attaining the main point of large production from resources as yet only beginning to be worked upon, and their distribution, to the neglect of the lesser elements and close economy in the small details, and to the total lack of any conception on the part of the owners and occupants of buildings, that they themselves are the only persons who can prevent loss by fire, by attention to construction and suitable safeguards; fire departments being only capable of dealing with the fires when they occur, and underwriters being only capable of showing the way and giving advice by which the heaviest losses may be saved.

The safeguards which are now being introduced, notably the automatic sprinkling system, might, in the judgment of the writer, abate more than one-half of this annual loss. The larger part of the losses are in the large workshops, factories, warehouses, and shops for the distribution of goods. They occur in a relatively small number of fires, each of large proportion. They occur, in by far the large majority of cases, in buildings which, although not good models, are capable of being well protected by automatic sprinklers, by standpipes and hydrants at vantage points and upon the roofs, so adjusted as to be worked by the public fire department, and by care in occupancy.

The invention of the self-sustaining steel frame building, developed in the construction of what are known as sky-scrapers, has brought an entirely new problem before the underwriters as well as the engineers. In the first instance it was assumed that because a building was made of incombustible material it might be considered indestructible by fire, with very slight protection to the metal from heat. The Factory Mutual Underwriters distrusted this theory and have, with rare exception, kept unprotected steel beams from being used to support plank floors, and have, in recent years, caused cast-iron posts, formerly used in the support of factories, to be disused, the preference being given to squared wooden posts.

With the increasing cost of timber and possible scarcity of large logs it became expedient for the representatives of the Mutual Underwriters to be prepared for so-called fireproof construction. To that end the Insurance Engineering Experiment Station has been established under the charge of Professor Charles L. Norton, and under the general direction of myself, for testing both by fire, by laboratory experiments, and by lapse of time all the different methods of so-called fireproof construction and all the fire-resistant and fire-retardant materials for inside finish. The experience of the underwriters who insure the steel-framed buildings has not justified the great confidence with which the work was undertaken. Very destructive fires have occurred in buildings of this type, which have been filled with combustible contents. In some cases it has been the judgment of the appraisers that the total loss on contents of very large value has been due to the resistance of the building; whereas, in buildings of ordinary construction which fell after a fire of moderate duration, there have been large salvages on damaged goods.

Several of the methods of protecting steel from heat have failed, and while the building has stood well and has, I believe, in all instances been capable of repair, there has been much damage by heat, especially in the upper stories. It has proved that the prevention of loss by automatic sprinklers is as necessary in an incombustible building as it is in any other. A large portion of the biggest department stores are now being equipped. Other fires in incombustible buildings, causing very little damage, have generated so much suffocating smoke as to make them hazardous and to lead toward the danger of a panic.

But beyond this question of fire hazard is the yet more important problem of corrosion, a factor which at the beginning attracted little or no attention. It unfortunately happens that the type of steel used in the construction of buildings is more subject to rapid corrosion than any other type of metal derived from iron ore. Whether or not the skyscrapers will be safe for any considerable period of time, say for a generation, is now an open question. How to protect steel is being made the subject of the most exhaustive investigation, and will be one of the most important subjects dealt with in the Insurance Engineering Experiment Station.

It may happen that we passed through the age of unbaked clay to stone construction covered in with timber roofs, then to timber, brick, and stone in combination; in this country, through the age of the log house to the period of plank boards and scantling, or combustible architecture, so-called; then to the period of iron, used mainly outside, filled in with brick for walls, iron posts and beams within; thence to the age of steel in the present type, from which we may pass on in the upward spiral again to the age of clay in its various forms of brick, concretes, and cements, in that way combining stability, durability, and safety from the danger of fire from within or heat from without.

If the foregoing explanations of the condition of the United States in respect to loss by fire are sustained, the general conclusions may be stated as follows:—

1. Entails upon land and succession by primogeniture are either forbidden by law or by common practice. Estates in land, as well as in personal property, are customarily distributed in equal proportions among children without regard to sex. Settlements in trust are limited in all States, I believe, and might perhaps be more strictly limited with advantage. Spendthrifts and incompetents can only be protected by trustees through about one generation; after that the tools of production, whether in land or capital, fall by distribution to those who may use them best.

2. Public buildings are now being or have been constructed with more or less regard to duration, many of them for long duration. Factories, workshops, railway termini, industrial and commercial buildings are and have been built with a view to short duration, in order to give place from time to time to buildings that may be adjusted to the improved conditions of each generation or shorter period. Dwelling-houses in cities have been constructed with a view to longer duration, but with scarcely an exception the sites of dwelling-house districts have within one or two generations passed over to use for business purposes. In many cities that is now going on at a more rapid rate than ever before. Dwelling-houses of the best class, capable of useful occupation for fifty years, are being pulled down to make way for the expansion of trade and commerce. The adjustment of buildings to the purposes of each generation is almost as necessary and almost as rapid as the changes in the mechanism which is put into operation in industrial buildings. The factory or workshop which does not throw out mechanism, perhaps but half worn, in order to adopt the latest improvements, is sure to be left in the close competition on the very small margin of profit which suffices for the modern method, and of late the buildings must often be displaced as well as the machinery.

The series of documents mainly issued by the Boston Manufacturers' Mutual Fire Insurance Company, of which the undersigned is President, during the last twenty-five years—of late supplemented by documents issued by the associated companies—have been published for the purpose of bringing construction and apparatus to a fixed standard.

1. General plans and specifications for the mill or slow-burning construction of factories, workshops, and storehouses.

2. The lay-out of reservoirs, pumps, pipes, and hydrants in due proportion to the requirements in each case.

3. The lay-out of standard protection with automatic sprinklers, sizes, and proportions of pipe and distribution of heads.

4. Steam fire-pumps constructed at the

standard established mainly by John R. Freeman, C.E., now one of the executive officers of the Factory Mutual System.

5. Standard valves, meters, and by-passes for water supply; and standard air valves used in connexion with the automatic dry-pipe sprinkler system, for the protection of storehouses and other buildings that cannot be heated in winter.

6. Glazing for the diffusion of light with ribbed or prismatic glass, adapted to the special conditions of each building or section of a building.

7. Standard fire-resistant doors and frames, of wood encased in tin.

8. Standard of wired-glass windows and frames, often approved where light is needed, and often accepted in preference to movable shutters.

9. Standard of the fire, flash, and viscosity tests of mineral lubricating oils.

10. Standard of mineral illuminating oils and of lamps in which such oils may be used for lighting.

11. Standard lanterns for the use of watchmen or mechanics employed in night work, both for the burning of sperm oil and kerosene oil.

12. Standard for the lay-out and safeguards for supplying electric power or light.

13. Standard for housing hose and fire appliances in mill yards, with specifications for the equipment of such houses.

14. Standard general organisation for mill fire departments.

15. Standard forms for the regular self-inspection of the insured mills and works, subject to variation according to the nature of the industry.

A physical laboratory is maintained by the Associated Factory Mutual Companies, to which any kind of oil, hose, or other material may be sent for physical tests, chemical tests being made at the Massachusetts Institute of Technology. As soon as the requisite buildings have been constructed, fire and heat tests will be made by the Insurance Engineering Department in respect to all so-called fireproof or fire-retardant materials that may be used either for the protection of wood or steel or in the construction of buildings. It may be added that the cost of making surveys; layouts; inspections, special and regular, including the cost of making and executing plans, of which an example is sent herewith; and for the services rendered by the Bureau of Inspections on joint account and at the joint expense of the Associated Mutual Companies, is covered by a charge of one hundred and fifty dollars ($150) on each million dollars of insurance written.

In 1895 the most destructive fire to which the companies had ever been subjected originated in what is called the spontaneous combustion or slow oxidisation of the wooden lagging of a 10-ft. cylinder of a compound engine in a room for which sprinklers were under contract, but had not been placed. Under conditions that might never occur again, the loss of over a million dollars was distributed among the Mutual Companies. In that year, however, nearly complete protection by sprinklers in all main mills and works was brought to a conclusion; since that date, 1895, the losses by fire have been less than four cents per 100 dols. (·0004 per centum) each year, the larger part of this small loss occurring in unsprinkled storehouses, which will all be under sprinkler protection before the end of the present year.

In the interval, as other new causes of danger have arisen, skilled experts have been called into the service in every branch of physical science, except in electricity, in which department at the beginning there were no skilled experts, and the fire hazard was an unknown quantity. A well-bred engineer was therefore brought into the service to study the fire hazard of electric lighting; rules for the instalment of electric plants were established, brought to the attention of all the makers of electrical apparatus, and made the condition on which they could put their plants into the factories insured in the mutual system. The rules have been expanded to meet new conditions and new inventions, but have never been materially changed.

The whole subject of lubrication with mineral and mixed oils was made the subject of a complete study. A standard was established, and wherever volatile oils were found in use they were condemned. The Standard Oil Company was induced to change its whole method of distillation, adjusting patent contests, and presently, within a year, putting on to the market such excellent lubricants at so low a price as to cause all the dangerous oils to disappear. Each subject has been taken up, put under the charge of thoroughly trained engineers and experts, until at the present time the science may be called complete in its application to the special classes of property insured, and to the buildings constructed on the slow-burning principle.

After a short discussion, the following resolution was moved and agreed to, *i.e.*:—

"That the mutual insurance system, as adopted in the United States, materially tends to the prevention of fire and the reduction of fire waste."

The delegates then dispersed to the various sections into which the Congress had been divided, *i.e.*, (1) Building Construction and Equipment; (2) Electrical Safeguards and Fire Alarms; (3) Storage of Oils and Spontaneous Combustion; (4) Fire Survey and Fire Patrols; (5) Fire Losses and Insurance; (6) Fire Tests and Standardisation.

Section 1 was presided over by Privy Councillor J. Stübben, in the Council Chamber, Caxton Hall, and the first paper read was the following by Firemaster Arthur Pordage, of Edinburgh:—

Building Construction from a Fire Brigade Officer's Point of View.

In taking up as my subject "Building Construction from a Fire Brigade Officer's Point of View," I have clearly before me the fact that most architects and builders are fully alive to the necessity of fire-resisting construction, and that legislative and local enactments make stipulations and recommendations with the view of preventing destruction by fire. Such efforts are worthy of praise; but my experience in combating fire leads me to the conclusion that what is intended as a safeguard too often becomes a danger, and what is theoretically meant for strength is found in the hour of need a source of weakness.

I do not presume to dictate, but I feel it my duty to sound a note of warning regarding certain widely spread and much cherished convictions as to fire-resisting materials employed in public buildings. Speaking, as I do, under the auspices of the Fire Prevention Committee, I address myself more particularly to those who are responsible for the construction of buildings, but I appeal also to those of my colleagues who are responsible for dealing with buildings after the fire has begun its work. The question of the general arrangement or architectural planning of buildings does not enter into my argument; what I propose to deal with is the type of building usually described as being constructed entirely "fireproof," and to offer from my practical every day experience suggestions which may perhaps induce building constructors to reconsider certain accepted theories in connexion with so-called "fireproof" materials.

From the fireman's point of view these "fire-proof" buildings have an element of danger added because of their construction, both in the way of increased risk to the fire brigade and the destruction of property. If such buildings were to remain unoccupied and to be subject to no risk beyond the combustibility of their own non-inflammable construction, then certainly they could with propriety be described as "fire-proof." But when (as is universally the case) such buildings are stored with goods readily inflammable, the buildings cease to be "fire-proof," for the action of the fire plays havoc with that portion of the material which is theoretically "fire-proof."

Sufficient attention has not been paid to the bearing these so-called "fireproof" materials have in relation to the calorific effects of the burning materials stored in the buildings, for, after all, it is the contents rather than the structure which in a large majority of cases commence to burn, and which will continue to burn, no matter in what kind of building they are stored. Sufficient attention has also not been paid to the effect of water applied to building materials after they have been subjected to extreme heat.

How do these "fireproof" materials assist the salvage of either the buildings or their contents? Do they assist entrance with safety to those combating the fire?

On each of these points I shall endeavour to prove a negative from my own personal experience, which, I feel confident, is not singular, but is common to the fire profession.

Materials principally considered to be "fireproof," and which are so styled by the legislative Acts, are iron, concrete, and stone. The latter is particularly mentioned in most Acts as "stone or other fire-proof material." We have to ask ourselves whether these materials are "fire-proof?" When employed in the internal fittings of a building we may unquestionably give a decided negative to that question. My decided opinion is that the materials which meet the requirements are those which are not subject to the laws of expansion and contraction when suddenly exposed to the effects of heat. What are such materials? If we may take for our guidance the results of the tests of time, we find them principally in timber, bricks, mortar, and good plaster.

Floors and Ceilings.—It is the common experience of every fireman that an ordinary wood floor with a thin plaster ceiling underneath has stood the effects of a fire for probably an hour, and though burned through in places still remained in position and with sufficient stability left in the joisting to admit of the fireman passing over it in the course of his operations in extinguishing the fire. If such a floor survives the effects of fire with its slender remains still in position, how much better would a well-constructed wood floor resist the effects of fire under similar conditions. No extraordinary precautions are necessary to construct such a floor, but I suggest that the ends of the joists should be well bedded in the walls, flooring boards of not less than 1 in. thick be well tongued together, the spaces between the joisting be filled with pugging or other deafening, the underside or ceiling coated with 1 in. of good plaster on wire laths. Such a floor will resist a fire either from the top or underside sufficiently long to enable any ordinary fire brigade plenty of time to complete their toilet before turning out, and arrive in time to do some good work and prevent the floors from collapsing. Where supports are required, owing to the large superficial area of floor space, built timber supports or columns have been known to remain in position and to serve the purpose a second time after having resisted the effects of a severe fire. If these wood posts or columns are wire lathed and coated with good plaster, and treated in a manner similar to that often adopted with iron columns, they would come out practically unscathed. It will, perhaps, be argued that this method by no means gets rid of the difficulty with large spans, where iron must of necessity be introduced, but in such cases wrought-iron columns and girders (well protected) should be used to carry wood flooring and joisting, which latter, being impervious to the effects of heat and cold, remain in position, whereas the concrete floor falls in sections, and often wrecks the lower floors, which would otherwise not have been affected by the fire. I have known it to be argued that the burning of a wood floor gives off so much smoke that the inmates of a building would be suffocated before being reached. To properly understand this point it is necessary to compare the results of fire on both classes of flooring. We must remember that a partly-burnt but intact wood floor always affords a means of reaching the inmates, and that before the floor surface commences to burn the fire must have been very severe, and the contents of the apartment would almost certainly have been involved. It frequently happens that the flooring in "fireproof" buildings begins to break away at the early stages of a fire, preventing the fireman entering to attack it, with the result that the operations must necessarily be conducted from the outside, thus giving the fire a chance to make some headway. On the other hand, when the water can be got on to the wood floor and supports there is the possibility of keeping the floor intact.

I will specify a few instances in support of my contentions. The first instance is that of a fire on carriage builder's premises of five floors, which were built upon fireproof principles, the floors consisting of transverse 24-in. plated girders and floors of 9 inches of concrete, without protection on either side. The fire commenced in the paint-shop on the ground floor (a chamber built expressly for the purpose and having no communication with the upper floors). Upon the arrival of the brigade it was possible to see that one end each of the first and second floors was gone, and that the vehicles on the third floor were alight. The upper windows were

blown out, and immediately the cold air and water got on to the third floor, the whole of this floor went down by the run, carrying everything through the building to the basement. As a result, only a portion of the top floor remained; the iron girders were somewhat twisted, though not displaced, but the concrete collapsed and fell, leaving nothing but the bare walls. The firemen could not be sent into this building. Had the upper floors been of wood they would undoubtedly have been saved.

The second instance is that of a fire on the second floor of a five-story warehouse built on a similar principle, wherein the third floor sections of concrete fell whilst the firemen were directing the hose upon the second floor, with the result that its weight carried the second and first floors through into the basement. This fire would have been stopped on the second floor but for the collapse of the floors above.

The third instance is an illustration in favour of timber floors. At a riverside warehouse in the City of London I attended three fires on the same premises in three successive years—the first two were serious outbreaks—but I noticed on the last two occasions that the same wooden uprights still supported the floors, and many of the exposed wood joints bore evidence of their reliability on their charred surfaces.

Partitions.—I now come to the question of partitions. The reliability of partitions between the different sections and rooms of a building, whether dwelling-house or warehouse, to resist fire, is of the utmost importance, and often determines the fate of the building. The progress of a fire is often regulated by the area of the compartment in which it originates and the internal partitions; therefore much depends upon the time during which the latter remains intact. The wooden lath-and-plaster partition may be immediately thrown out of court, the light laths with rough edges and the space between being a ready conductor of fire from one part of the building to the other. Internal partitions should be solid, preferably of brick, and continued up right through the building, the joisting at the different floors running through them, so that they practically form an internal wall from the basement to the roof. The advantages of such a partition would be many, apart from being a factor in fire prevention.

Stairs.—Great stress is laid upon the idea of employing stone for staircases as a safe and reliable exit for a large number of persons from a building on fire. This is a very good principle under certain conditions, and these are that a stone stair should be built in a well, apart from the general building, and in such a manner that fire or heat cannot possibly get at the underside of the stair. Where a staircase must necessarily run through a building, stone or concrete should be avoided in its construction, but good solid wood (hard wood by preference) is the most reliable under all circumstances. If the underside of the treads be filled in with "deafening" and coated with good plaster, such a stair will remain in position during the progress of a fire long after it has been impossible for any human being to traverse it. If the stair should actually get alight, and the fire, fed by an open door, should even cause it to burn fiercely, so soon as the hose is applied by the fire brigade the fire will be almost immediately extinguished because the actual burning is only superficial, and there will remain sufficient substance to admit of persons passing over the stair. It may be argued that a stone stair would not take fire at all, and therefore would always remain passable, but every fireman knows that when there is sufficient heat and flame to ignite the wooden structure of a hard wood staircase it is quite impossible for any one to pass either up or down a stone stair under similar circumstances.

In my preference for wood in the construction of stairs I specially exclude light and flimsy wooden flights of stairs which are so very frequently found in some dwelling-houses, warehouses, &c., and the wooden step-ladder almost invariably found in factories. I speak of a well-built staircase with hardwood treads and facings, the under side filled in with deafening and coated with plaster. Stone, as employed in stairs in ordinary buildings, cannot in any sense of the word be considered to be "fire-proof," because it succumbs to the effects of heat and fire more readily than any other material employed in the construction of buildings. That portion of the stone tread which is exposed to the fire readily expands under its influence, whilst the ends, which are embedded in the wall, remain normal, the natural consequence being a fracture near the wall, and the collapse of the projecting portion.

I am continually told in Scotland that the reason so many lives are lost at fires in London is on account of wooden stairs, and that there is less loss of life in Scotland owing to the almost universal practice of putting in stone stairs. Having had considerable experience at fires in both countries, I am in a position to say that the idea is entirely erroneous. Most of the lives lost at London fires are at small fires in small dwellings, and in the majority of cases in dwelling-houses situated over shops, where the access to the house is through the shop, thence by a very frail, unprotected, and flimsy wooden staircase. When the shop takes fire, the exit from the house is immediately cut off by the fire and smoke rushing up the staircase. The same conditions apply to the ordinary London dwelling-house, which is let out to a large number of families — the open staircase runs from the street-door through the interior of the house, and every room opens on to it, and escape by this stair is cut off by the first rush of smoke or flame. The system which is almost universal throughout Scotland is very different. Take a block of buildings consisting of shops with flats above. There is no communication between the shops and the houses. The proprietor of the shop does not necessarily live above it; in the majority of cases he lives in another part of the town. What are the circumstances when a fire takes place in one of the shops? It may be burned out, but, given that the ceiling is fairly good and the fire brigade receives a good call, the fire will rarely pass the boards which support the 4 in. or 6 in. of deafening which is universal in Scottish buildings, and forms a splendid barrier to the fire.

The approach to the houses above being by a stair-well, built quite apart from any connexion with the business portion of the block, does not allow the fire to be communicated to the dwellings by the stair-well, for in order to do so it must first pass through the wall dividing the stair from the shop. It rarely happens that a shop fire in tenement blocks spreads to the house immediately above, and when it does, the inmates of the house have had time to escape by the independent staircase. By way of justifying these contentions in relation to stone stairs, I recall a few instances observed at buildings after fires.

At a fire in a large suite of offices with a spacious stone staircase some 6 ft. wide, waste paper stored in the cupboard space under the stair leading from the ground to the first floor, caught fire and was destroyed, a bucket of water was capsized over the stairs, and the whole flight immediately collapsed, scarcely leaving a fragment in the wall to indicate where the stone had been, whilst the thin wooden panelled door enclosing the cupboard remained intact, with the exception of the charring on the inside.

At a fire in a large music warehouse, an unprotected and lightly constructed wooden stair led from the basement to the ground floor, terminating on a stone slab 5 ft. square and 5 in. thick, from which a handsome wooden stair led up to the first floor showrooms. The fire originated in the basement, and flowed up over the stairs to the first floor. When the fire was extinguished, both wooden stairs, which had been exposed to the full effects of the fire, were found much damaged, but sufficiently substantial to admit of the passage of the firemen; but the stone landing had collapsed into a thousand fragments.

Still another instance of the unreliability of stone for a staircase. At a fire in a fine old mansion house which was partially destroyed, the stairs in the end wings were of stone from the basement to the second floor, whilst those from the second to the third floor and from the latter to the roof were of white wood with wooden hand-rails. Practically no actual flame got into the stair-case, but the heat passed up the stair-well, with the result that the whole of the stone stair collapsed, leaving heavy jagged ends projecting from the masonry, while the wooden stairs, where by far the greatest temperature must have been, were merely blistered and scorched.

Iron Stairs.—It has been equally demonstrated that iron, and especially cast-iron, is utterly unreliable under the influences of fire; whilst wrought-iron will buckle and twist itself out of position, cast-iron will collapse entirely. I give an instance which very recently came under my notice at a fire in a manufacturing stationer's warehouse; the offices were situated on the first floor, to which a cast-iron spiral staircase had been erected in a specially-constructed well as a safety exit for the office staff. The fire originated on the ground floor. At the first rush several of the office staff made for the iron stair, but only a few were able to get down this stair; the others were cut off by the very first flow of flame, and were rescued from the windows. The fire was speedily extinguished near this point, but the whole stair collapsed within ten minutes of the outbreak.

Roofs.—The matter of the general arrangement of roofs deserves to receive more serious attention than is usually given to this most important part of the modern building. Unfortunately a fire-preventive roof does not appeal to the artistic eye, especially in large modern country houses, where the Old English style of architecture with its long sloping gables has found so much favour of recent years. These high roofs admit of the fire running all over the building, and their construction prevents a fire being attacked from the outside until a hole has been burned through the roof. In all buildings where fire prevention is aimed at, the division walls should be carried at least 3 ft. to 4 ft. through the roof, with a ledging of at least 2 ft. round the edge, which would admit of men working upon it in case of fire. Such a ledging affords a ready means of both saving life and attacking a fire. The roof is one portion of a building where iron may be used with advantage by reason of the light weight which it has to support and the necessarily exposed condition of its construction. A lightly constructed trussed iron roof reduces the risk of a fire originating and spreading in the roof to a minimum.

Conclusion.—The opinions I have expressed in this paper are facts well known to the fire service and recognised by some architects, and are worthy of the most serious attention by the building profession generally. There are are many points in building construction which are continually presenting themselves to the fireman, but which the architect rarely sees and has, therefore, no opportunity of studying, and these points, when advocated, being so foreign to accepted ideas, are naturally very adversely received and criticised by the building profession.

As a case in point, some time ago whilst in conversation with the authorities responsible for an important historical building, I suggested that certain additional precautions should be taken from a fire-prevention point of view, and as a precautionary measure in dealing with a possible outbreak. I knew there were very bad risks, especially in the roof, which I pointed out, but was told that the building was perfectly safe, the roof was not an old one, it had been renewed not more than forty years ago, and that iron doors had been put in to divide the different sections of the building. Now, every fireman knows that a long, continuous roof which exposes a forest of unprotected and rough-edged and dried timber, is a very dangerous risk; also that iron doors have long proved a failure as a protection against the spread of fire, and that they are inferior to a heavy solid wooden door which remains in position long after the iron door has buckled out of its frame and ceased to fill up the opening.

Whether or not I have made my meaning clear or overstated my views, I think you will at least agree that the subject is one of more than passing importance, and that exchange of views and experience is most desirable. To prevent possible misunderstanding, I desire to say in conclusion that while advocating the more general employment of timber in buildings, I do not include in this category the light pine and deal stairways, thin wooden doors and matchboard lining partitions, but the employment of substantial timber well protected where possible, and of course the avoidance of all exposed edges.

The conclusion I have arrived at, after much observation during a long experience of fires in London and Edinburgh, is that "fireproof" construction, as generally understood, is a source of danger; that, wherever possible, good timber flooring, supports, and stairways should be employed, together with brick partitions; a liberal application of plaster, and an avoidance of air spaces, would result in a lesser destruction of buildings by fire, ensure

easier manipulation of fire-appliances and a more effective use of the same, and result in a greater salvage of property during the progress of fires. In a word, I advocate the study and use of fire-retarding rather than non-combustible materials as the direction in which safety and fire-protection may more certainly be found; whilst where the more modern forms of planning necessitate provision for big spans and very heavy loads, the systems of construction now erroneously termed "fire-proof" must be so protected as to become fire-resisting.

In the discussion which followed, a delegate referred to the advantage of brick staircases as against wood staircases.

Mr. A. Darbyshire, F.S.A., also referred to the same subject. In large public buildings the staircases should be of reinforced concrete, and he could not follow the arguments in favour of the adoption of wood staircases.

Mr. E. G. Rivers, M.Inst.C.E., official delegate of H.M. Office of Works, said there must be distinct methods of dealing with various classes of buildings, and it would be unreasonable to apply the same system of construction to domestic buildings as to those of a public character. Nor was there any necessity for such a course. Much, however, could be done in domestic buildings in rendering the wood construction less inflammable by treating it with one of the many solutions now on the market. Roofs could also be formed of fire-resisting material, and this without much expense. The issues as to public buildings were greater, and so it was necessary that the legislation for the protection of life from fire should be more stringent. The object of the designer of such buildings should be to prevent the spread of fire from one room to another: to adopt such a system of construction that a fire, should it occur, would be kept to one room or department, and do no more damage than burn the contents of that room. The watertight departments of modern steamships illustrated what he meant.

An American delegate said that fireproof buildings in the United States had few floors with openings in them unless they were protected. Salvage, especially from water damage, in these circumstances, was large, for when the floors were so constructed the water which was poured on to a building did not go from floor to floor.

Mr. J. H. Dyer, Vice-President, N.F.B.U., Alton, said that partitions should be of brick, but when they were of matchboarding the air spaces should be filled in with some incombustible material, like slag wool pugging. As to party walls, if they were only carried up to the underside of the slate or tile they were a great protection from fire.

Mr. Pordage, in reply, said that undoubtedly brick staircases were better than wood from a fire protection point of view; when he spoke of wood staircases he meant staircases for internal purposes in domestic dwellings. He thought that the remarks of Mr. Rivers were generally in support of the views expressed in the paper. As to other remarks, the general results from a practical fireman's point of view tended to show that sound wooden construction—solid wood beams, &c.—instead of leading to disaster in a fire, helped to preserve the original form of the building, whereas, with iron construction, the result of a fire was generally total ruin. As to the use of plaster on wire with wooden supports, it was said that the plaster had been tried in America without the wire with unsatisfactory results. He (the speaker) suggested that the plaster should be put on with the wire. His objection to all kinds of steel and iron and concrete erections was that the heavy weight of the material of construction tended to wreck the building. He had advocated the use of an iron trussed roof; that might be inconsistent with his other remarks, but the roof of a building, if built of iron trussing, with slates or tiles, was not only not inflammable, but it was not likely to buckle, as the girders did in other parts of the building when exposed to fire, because it had very little weight to carry.

A vote of thanks having been accorded to Mr. Pordage,

Mr. Darbyshire took the chair, while Privy Councillor J. Stübben, late President of the Amalgamated Societies of German Architects and Engineers, and late City Surveyor of Cologne, read a paper in German, entitled "Urban Fire Protection as Influenced by Street Planning and Building Regulations."

A vote of thanks was heartily accorded to the author on the motion of Dr. Jaffé, and Herr Stübben again took the chair.

Modern Warehouses and Sheds in the Free Hansa City of Hamburg.

Chief Officer Westphalen, Fire Brigade, Hamburg, then read a paper on "Modern Warehouses and Sheds, Hamburg," of which the following is a translation:—

"In the German Empire it is necessary, according to the regulations laid down in paragraph 16, and the following paragraphs, to obtain the permission of the authorities empowered by the laws of the nation: 'For such buildings as by their local position or by the nature of the industries carried on in them might cause important prejudice, danger, or annoyance to the proprietors or inhabitants of the neighbouring sites or to the public in general.' It is, therefore, the duty of the authorities to prescribe in each case the measures necessary to secure safety from fire in the construction of the building and the working of the business.

But mercantile warehouses and stores do not fall under these regulations, although they contain great quantities of combustible goods, and also include some industries, except when the regulations from par. 16 et seq. are applicable to the latter, which, however, does not often happen. In Hamburg, moreover, the Police Building Law now in force must be taken into consideration. This contains a number of regulations for fire protection, and, among other things, enjoins that the outside walls must be solid and the roofs fireproof; but it provides no definition whatever of the space permissible between the party walls, nor any regulations concerning the nature of the interior construction of the stores. Only for that district of Hamburg which has been handed over to the 'Freihafen Lagerhaus Gesellschaft' established under State guarantee has it been laid down in a law *ad hoc*, that special sanction is necessary both for the building and working of stores. To this company belongs a very important part of the store district in Hamburg, containing up to the present 114 stores, covering an area of about 62,000 square mètres. For these buildings, then, the authorities prescribe regulations and conditions both for construction and working as occasion arises. Besides this, on the quays at Hamburg a great number of store-sheds have been erected almost exclusively by the State of Hamburg for its own use. These store-sheds cover a total space of about 385,000 square mètres.

The business carried on in these quay sheds requires that large modern ships (carrying up to 22,000 cubic mètres of goods) may be unloaded and loaded again in the shortest possible time. This is done by iron cranes on the quay, 272 of which are worked by steam, 215 by electricity, seventeen by hydraulic power, and 139 small ones by hand. The goods lying only a short time in these storesheds, and being forwarded as soon as possible, must not therefore be piled up high. They must also be promptly sorted after unloading. Accordingly, each shed must be on ground level, and have space to take comfortably the whole cargo of the largest steamers. The newest sheds are about 200 mètres long and 50 mètres deep. They have no partition walls. They are quite open to the quay in front, and the rear wall is of wood; at the two ends are solid gable walls which are carried above the roof. Between the different sheds there is generally a space of about 30 mètres; in a few cases, where two sheds are built together, being separated by the gable wall, any doors in this wall are fireproof. In this kind of construction each shed, occupying a space of about 10,000 square mètres, presents a single great risk.

The internal supports, as well as the roof construction, are of wood, while the roof itself is made of 'pappe' (paper). Considering the circumstances, these are altogether the best materials, for one cannot use for these sheds materials which would completely resist a really large fire. The roof would, therefore, in any case suffer with the rest of the building through the fire, and also a light wooden construction can more easily be cleared away and renewed than one of iron. Wooden construction has the further advantage that the cost of a renewal is not a great consideration. On the other hand, the interruption of business caused by work of long duration would cripple any part of the quay in which it might happen, and entail great loss of money.

The modern stores in Hamburg are constructed quite differently from these sheds. To the former, of course, different principles and different conditions are applicable. The ground on which these stores stand is very valuable, and the goods generally remain in them a long time; they are therefore built with a number of stories. Such a store is about 16 mètres wide and 22 mètres deep inside, and has therefore, after deducting for staircases, an available floor-space of about 325 sq. mètres in each story. The outer walls are naturally of solid masonry, and the roof is fireproof, the gable walls being carried 1½ mètres above it. The inside construction consists of iron supports protected by fireproof material and iron girders protected in the same manner. The ceilings between are made of "Beton," with layers of iron (System 'Koenen'). Above this lies a floor of wood.

Complete encasement with thoroughly fireproof material—for instance, hard burnt hollow bricks, as is often practised elsewhere, would naturally offer the greatest security against danger from fire, but it costs considerably more than that used at Hamburg, and with the good alarm system and organisation of the Hamburg Fire Brigade, it may be taken for granted that the internal construction of these stores will resist a fire until the fire brigade has had time to extinguish it.

The floor in each of the stories has a slight fall towards the front and back in order to carry off the water that may have been used for extinguishing fire inside the stores, and by means of the outflow pipes fixed on the front to prevent it from doing damage. In these modern Hamburg stores each story has, therefore, its own separated risk, which is not at all a great one.

The staircases of these stores deserve special notice. For each store there are two stairs, the one at the front for general use and that at the back for use only in case of fire. In order that the back staircase should take up as little of the valuable floor space as possible, each staircase is so arranged that it serves at the same time for two stores. Access to these staircases is obtained by an iron balcony on each story. The back staircase has a fireproof entrance in the cellar and leads up to the roof, where small iron stairs provide an escape in case of need over the parapet wall. This practical arrangement of the stairs allows of the greatest possible use of the floor space for storage purposes, and at the same time gives the fire brigade the power of attacking the fire from two sides.

Most of the Hamburg stores serve only for storing goods, but some of them also contain working machinery. This cannot be avoided, as many business houses must manufacture their goods direct in the stores, but in such cases the plant is put in special compartments, which are separated by fireprooof partitions from the stores. The unavoidable openings in the floors are also as much as possible protected by fire proof material, so that in such cases everything possible has been done to divide the whole building into as numerous, and therefore small, risks as possible.

If, on the one side, the Hamburg stores of the modern type may be considered 'model buildings' from the standpoint of fire prevention, yet on the other side it must be pointed out that the fire organisation of Hamburg has only been able to gain this success after many struggles. For a long time the building engineers offered insurmountable opposition. Perhaps they were anxious not to hide their intelligently-designed and elegantly-executed iron structures, but to maintain them in full view of all the world. The old myth was continually served up anew that the iron might suffer from rust behind the fireproof covering. Therefore, this covering ought at least to be made removable. Such removable coverings are much too expensive and utterly impracticable for warehouse purposes.

When the fire organisation, supported by the fire insurance companies, energetically refused to maintain any more stores with unprotected iron construction, at first wood was again employed and supports and girders made of oak; but at last the fact that such a quantity of oak could not be obtained, or at least only at an impossible price, furthered the ends of the fire brigade. Since then the stores at Hamburg have been built according to the modern fireproof system.

Now we might suppose that the fire insur-

ance companies would allow a considerable reduction off the premium for goods which are stored in such model warehouses, but unhappily this is not the case. The fire insurance companies have formed a ring, and are fixing the amount of the premium to suit their own views, and they take care that the high premium shall be maintained as long as possible. This is indeed greatly to be regretted. I think the fire insurance companies, if they properly considered their own interests, ought, by reducing their premiums, no longer to refuse a practical recognition of the able and successful struggle of the fire brigade for fire prevention, otherwise the State may yet carry out the idea of insuring such favourable risks as the Hamburg warehouses present."

A vote of thanks having been passed to the author,

M. A. Schepers, Commandant du Corps des Pompiers, Anvers, read a communication entitled "Rapport sur le Reconstruction de l'Entrepôt Royal d'Anvers, au Point de Vue de sa Résistance au Feu."

A vote of thanks was passed to M. Schepers.

The following paper by Mr. Max Clarke was taken as read, *i.e.*,

How to Make Existing London Buildings More Fire-Resisting.

As you may imagine, the subject of this paper is not one which I should have chosen, and if it turns out that it has no fresh information to offer you, the excuse must be that nearly all that can be said on the subject has already been dealt with. Still, renewed consideration on the subject *may* bring out some fresh points, and if I cannot give any useful hints I always console myself with the hope that the discussion may bring out forgotten or overlooked information. One might admit at once that to make all existing buildings in London fire-resisting is a practical impossibility, so that you must take my remarks only as suggestions as to what might be done towards making buildings less inflammable than they are at present; even this might involve such an enormous expense that the owners of all classes of property would, I fear, look on my ideas as not in their particular interest; however that may be, we all have a duty to do towards our neighbours, and that consists partly in making buildings as safe as can reasonably be expected against danger to life and property therein contained. To carry out the idea of this paper in a logical manner, I should begin by dividing up the districts of London into risks, and then the buildings in these districts into sub-divisions of risks; but this sort of work I think I may safely leave to those whose particular business this is from an insurance point of view; my chief concern will be to deal with constructional details only, combined, of course, with the inherent danger there always is in the proximity of one building to another—always a source of real danger in large cities such as London. For instance, particular portions of the city of London have unfortunately got the reputation of being what are called dangerous areas. This may be due not only to the buildings themselves but also to the nature of the goods stored therein, and for this class of building I am afraid little can be done. The only thing we can hope for in this division of the subject is to render them less liable to communicate fire to those adjoining. On the other hand, large numbers of buildings not having within them goods or materials of a particularly inflammable nature are built or fitted up, and particularly the latter, in such a manner as to render them very dangerous when by some unfortunate accident they do get on fire.

Many of these buildings in their construction contain all the elements of danger, both to themselves and to their surroundings, and it is more particularly with regard to these that I consider a paper of this nature should call your attention. The idea of pulling down London wholesale, or converting all its buildings at one time into what are erroneously called "fireproof" structures, is eminently absurd. Still, much might be done at a moderate expense, which would render buildings and whole areas much less dangerous than they are at present.

Matchboard.—For instance, take the one item "Matchboarding." It is used in all sorts of places, in most of which it could very well be done without as regards the construction, and it is a material which, so far as safety in case of fire goes, should not be allowed under any consideration whatever. And yet one hears very little against it, probably because no one thinks of the extra danger involved in its use, or does not want to think, simply because it has been used heretofore and it is convenient, easily put up and just as easily removed, requires no time to dry, and is easily painted or decorated. Its use on walls and ceilings, particularly the latter, is much to be deprecated. I am now speaking more particularly of boarding made from soft woods, which when dry and painted or varnished is highly inflammable, the fire passing along it at a high speed, often rendering escape from a building impossible, even in the early stages of a fire.

The limited use of hard woods as wall covering for decorative puposes is not objectionable, particularly if fixed without any air space at the back. In all discussions of the present nature we should be most careful not to advocate views which would prove to be what may be called so excessive as to frustrate the very object intended. I would only make one further remark with regard to this class of material, and that is how fateful the results are when it is used as a ceiling covering with plenty of air space behind, seemingly specially arranged to create rapid and intense combustion.

In making these remarks I am quite aware that in the opinion of many this class of wall and ceiling covering possesses certain advantages, being suitable for buildings in which certain trades are to be carried on. My object is to impress upon you that these ideas are already antiquated, and that for every class of building and every trade some form of covering can be found equally suitable from all points of view, without any of its special element of danger.

Naked Ceilings.—We may now pass on to a form of construction which, alas is even more common in London than the one above-mentioned, viz., leaving large areas of the floor joists of buildings without any covering whatever on the underside. This is done, of course, with the clearly defined object of saving money in first cost, and it *does* save a certain amount; but whether that saving is commensurate with the greatly increased risk such a system of construction involves is for you to decide. I hope it will not be one of the arguments during the discussion that numbers of buildings constructed in this manner have never had a fire in them. This does not seem to me to be discussion at all, at any rate it is *not* "fire preventive" discussion.

There is one aspect of the case which must not be overlooked, viz., "What is fire protection worth?" In these days of commercial speculation most buildings have a remunerative value, beyond which the speculator will not go; his idea is that given a building which can be insured at a reasonable rate, it would pay better to build it in the cheapest manner than to expend a larger sum on a more fire-resisting building. The risk of its being burnt down is taken as a quantity worth so very little consideration that in many cases it is accepted in preference to the safer building. This, of course, is the difficulty met with in any attempt to make fire prevention general. But for this London would be fire-resisting, and I should not be before you at this moment. However, I have to try and bring to your notice items in everyday construction which could be brought into line with modern ideas without wholesale reconstruction.

The cure for the evils which I have already pointed out is, that in future matchboarding should not be used in new buildings, and after a certain date it should be removed from all old buildings. The naked joists in ceilings could easily be corrected and the ceilings made fire-resisting by covering them with wire netting or some form of expanded metal and plaster.

Studded Partitions.—I need hardly remind you that the ordinary wood partition, with its wood lath and plaster covering, leaving hollow spaces from top to bottom, *should* be a thing of the past. Unfortunately, such is not the case, in spite of the numerous forms of light partitions made which are non-inflammable and have no open spaces. Why the latter are not used it is hard to say, but if after a certain date stud partitions were to be abandoned it would render London as a whole much more fire-resisting than it is at present, and at a moderate cost.

Lift Enclosures and Doors.—I must now turn to a matter which seems to me to be most important in buildings of the warehouse class, namely, the means adopted at present for the prevention of the spread of fire in lift wells and generally in vertical shafts of this class. There is no doubt that this particular risk is not sufficiently considered, and great improvement could be made as regards retarding the spread of fire if all lift shafts were properly enclosed with some form of non-combustible material. The particular nature of the material I need not attempt to specify, as it would largely depend upon whether the building was an old one or in course of construction. If the latter, there is no doubt brickwork would be the most suitable, but some other enclosing material would be efficacious, at any rate for short periods, and it is these short periods which, in the initial stages of a fire, are of the utmost importance.

The doorways or openings to the lift shafts should not be mere openings, as is so often the case at present, or if the openings are fitted with doors they are too often of an open type, not in any degree preventing the passage of smoke and flame up the shaft. Iron doors are often fitted to openings in cases where there *is* a solid enclosure; but the doors are not close fitting and the fastenings are not designed with a proper regard to ease in opening and closing, and quite regardless as to their adequacy for preventing the doors bending or twisting when heated to a high temperature. Where the latter is possible of course flame and smoke pass through the small openings and ignite inflammable material on the other side, thus *contributing* to the spread of fire to an alarming extent.

Fire-resisting Doors.—Another small matter I have observed in connexion with iron doors, which should be avoided if proper fire-resisting qualities are to be obtained, is the total neglect displayed in keeping inflammable material at a sufficient distance from iron or other forms of fire-resisting doors. Only by exercising proper attention to this point can the full value of such doors be obtained. A door may in itself be a good stop against fire, though it become red-hot, but it is useless if in contact, or in close proximity to, combustible material on one or both sides. Attention to this matter is sadly wanting at the present time. Wood floors should not be carried up to the iron door frames, but a fairly wide threshold of concrete, stone, or the like should be formed on each side, and the same remark applies to the whole of the opening on both sides, as it is impossible to foretell on which side of the opening or shaft the fire may occur.

Fittings. — The same remark applies to fittings in shops and warehouses, not to say public buildings. Often after the building has been left fairly secure in the direction above mentioned, shop or other fitters come on the scene and fix woodwork everywhere as trade fittings, totally regardless of the risk of fire, and it is only by bearing this in mind always when designing, constructing, altering, or fitting up a building that the fire-resisting qualities of a structure, district, or city can be improved.

Fireplaces.—I shall now call your attention to some of the defects in fireplaces and flues which are being repeated every day in modern building work, and I hope you will understand that throughout my paper my attempt is to show the defects in London building, as it is only by deciding what the defects are that remedial measures can be taken.

Few know the number of fires caused by defects in and about the fireplace. Personally, I am disposed to think that most of the causes are brought about by careless workmanship, and a few perhaps by the use of methods which were quite adequate in former times, before the invention of what are now called slow combustion stoves, close ranges, boilers, and the like. I place first in point of danger the practice of building half-brick trimmer arches to carry hearths in wooden floors, the arches having the centering left in and forming an open space under the brickwork. The underside of this space is lathed with wood laths and plastered in the same plane, as a rule, as the rest of the ceiling. This form of hearth should give place, in my opinion, to a concrete or other self-supporting hearth, the full depth of the floor joists, having a flat soffit on which the plaster could be applied direct. Next I should like to advocate the use of fireclay linings to all flues, a common practice in many districts, but not in use as a rule in London. Improperly bonded and badly built flues, the brickwork of which is only 4½ in. thick, and in which bad mortar forms a considerable component part, and which after a time drops out leaving the joints open (this is often assisted or caused by the nails, spikes, or plugs, driven

in for the purpose of fixing inflammable finishings), all these defects lead to a considerable number of fires annually, the details of which I am sure my insurance friends know a great deal more about than I do. Wood finishings should not be fixed with iron spikes in front of flues unless the brickwork is of a greater thickness than 4½ in.; in fact, it is probable that a great safeguard against fire would be effected if woodwork in such proximity to flues was abandoned altogether. It seems to me a cause of danger that flues built with only half-brick surroundings are at times used for high-pressure boilers, kitcheners, and the like, the brickwork being quite hot when work is in progress, and in many cases much too hot for safety.

New types of stoves of either the "slow combustion" or "well fire" classes should not be fixed in old houses, unless a thorough examination of the hearth and its surroundings is made, numerous fires having been caused from timbers being in close proximity to chimney breasts, quite unknown to the people who fixed new and powerful stoves in old openings.

Areas, Light Wells, and Narrow Streets.—In cities like London, where land is of such great value, the size of areas and light wells will always be reduced to the smallest possible dimensions, thereby greatly increasing the risk of fire spreading from one building to another. The same remarks hold good with regard to narrow streets and courts. In cases such as these the only precautions which can be adopted are of a protective nature.

Windows in light wells should not be directly opposite each other; should be fitted with metal, or, at any rate, with hard wood frames; the glass should be wired or armoured, so that when cracked it would not drop out of the frames at once, thus allowing the passage of flame from one building to another with fatal rapidity. In more dangerous cases blinds of non-inflammable material might be used with advantage, or, better still, shutters which would fit the openings closely, constructed in such a manner as to prevent much twisting or buckling, and provided with fastenings, which, while admitting of rapid adjustment, would be secure against opening by accident or from falling bodies on the outside.

Shutters or blinds for use in courts or areas might be made of woven wire mounted on frames. This form would admit of a certain amount of expansion or contraction without damage to the frame; would admit a certain amount of light, which is always an advantage, and could be seen through from the inside, also a benefit in many cases. In connexion with any form of shutters, such as above advocated, the objection to having wood finishings near them cannot be too strongly brought before your notice. Any real advantage the shutters might be in case of fire in an adjoining building would be largely discounted if inflammable material was close to the openings *supposed* to be protected by the shutters.

My opinion on these matters is that we do not take advantage of the information we possess. Knowledge is of no use whatever unless properly applied, and my contention is that there is a vast store of information on this particular subject which is not made the least use of. What has been done before is repeated without properly examining the new methods with the object of applying any which might suit particular cases.

I have not dealt with any of the modern forms of fire-resisting construction, many types are so well known that they need no words of mine either of praise or condemnation. All I would say is that, as a rule, the details are not sufficiently attended to. In the case of sanitation we have for many years had good pipes, but even now we sometimes have not got good drains, and only by the very closest attention to the minor details shall we ever get them. It is exactly the same with every form of fire-resisting construction and any attempt to make buildings or districts safer than they are at present. If I may digress from the subject for a moment I would like to address a word to "the man-in-the-street," if any such be here, as to the saving of life from fire. Has he ever thought of the value of 50 yards of moderately stout rope and a block or pulley with a hook in the ceiling in front of a window? Why such a modest equipment should not be in every house, I cannot imagine. A stout belt with its ring and spring catch would be an advantage; but I say, given the rope and block, there is no reason why escape should not be practical for men—and for women also when there are men to assist them—from every building in London. With regard to such places as Eton or other public institutions, each individual should provide himself with his own rope, as he does his cricket bat or fountain pen. It might be years before it was required, but *when* required it should be in perfect order, ready for use at a moment's notice. We are desirous of helping all sorts and conditions of men and women, but it is also expected that they should do something to help themselves.

The conference then adjourned.

Visits to places of interest were made in the afternoon.

[Our report of the proceedings will be continued next week.]

THE MUNICIPAL AND COUNTY ENGINEERS' ASSOCIATION:

ANNUAL MEETING, LONDON.*

IN the discussion on Mr. Smythe's paper on "Tree Planting,"

Mr. Hall, Cheltenham, approved of Mr. Smythe's suggestion that Borough Councils should purchase young trees and grow them on their own land, as they would then know exactly the sort of tree they were having, get trees that were acclimatised, and save one-half the cost.

Mr. Scorgie, Hackney, was of opinion that those Authorities who were subject to public audit might have a difficulty by having the money spent on trees surcharged by the Public Auditor. There was at present a Bill before Parliament to make it legal to plant trees in roads.

The President (Mr. W. Weaver) said that referred to London.

Mr. Greeves, Buxton, said that in Buxton they planted trees wherever they could, and the Council had never been surcharged although they were subject to Local Government audit.

Mr. A. H. Campbell, East Ham, said that some two years ago they were able to get through the Local Government Board a sum of 600*l.* for the guarding and protection of trees. If they were entitled to guard they were certainly entitled to plant trees. They found that while the trees cost 4s. 6d. or 5s. each, the guards ran to no less a sum than 25s., a price which practically prevented them from developing tree-planting. He had designed an efficient tree guard which cost 9s. 6d., which was open to the use of any authorities who desired it.

The President thought it prudent not to plant trees very close together in London, and, he was of opinion that 35 ft. apart for plane trees was sufficiently close.

Cremation.

Mr. W. Nisbet Blair, C.E., Borough Engineer of St. Pancras, read a paper on cremation. He said the number of cremations carried out during the last ten years showed a steady, though slow, increase year by year. It might be thought that fairly good progress in securing the extension of the system had been attained in this country, but we were slow indeed as compared with other countries. In the United States there were twenty-five establishments, at which about 2,700 cremations per annum take place; in Italy there were twenty-seven crematoria; seven in Germany; two in Sweden; and one in Denmark. It was not on account of difficulty in obtaining sufficient land for cemeteries, that the author considered it justifiable to urge the substitution of cremation for earth burial; it was entirely a question of the health of the living.

The President said he believed this to be a matter which demanded the attention of the various authorities who desired to deal with the sanitary matters of their district.

Mr. J. T. Eayrs, Birmingham, and Mr. J. Lemon, Southampton, having spoken, Mr. Blair, in reply, said the more one was brought into actual knowledge of the conditions which followed the earth to earth burial of the past, the more one had evidence that the practice was entirely wrong, and that it was absolutely baneful in regard to the health of the living.

The proceedings of the Annual Meeting were resumed in the Council-chamber of the Town Hall, Kensington, on Friday, June 26 the President (Mr. W. Weaver) in the chair.

* Concluded from last week.

Risk of Fire in Temporary Buildings.

A paper by Mr. T. W. Aldwinckle was read, entitled "Minimising the Risk of Fire in Temporary Buildings." It is printed in full on page 45.

Mr. W. Nisbet Blair, St. Pancras, said the paper was of great practical value in these days when buildings were rushed up—working against time in order to meet emergencies; and from the experience a few months ago at Colney Hatch they realised how serious indeed was the matter of fire protection for temporary buildings. He did not see that Mr. Aldwinckle had referred to that method of protecting wood by some patented material of which many of them had had samples sent. He had tested one of these samples, and undoubtedly it did prevent the wood so treated from breaking into flame. They might put wood so treated into the fire, and it would char away, but would not break into flame. Fibrous plaster slabs or ordinary plaster did to a very great extent protect wood so covered from fire, but he did not think it was altogether satisfactory, because supposing the plaster got broken, as they knew it did, by the bumping of bedsteads into it in such places as hospitals, then it left the laths behind exposed to the risk of fire. The question of the extra cost of heating temporary buildings was an item to be considered, but still a very large item of cost was perfectly justifiable, and he did not think any one would hesitate in incurring considerable extra cost to secure non-inflammable buildings.

Mr. Gamble, London Fire Brigade, said the paper dealt almost entirely with temporary public buildings. Surveyors would know—more especially those in the provinces—that public buildings were only a small proportion of the buildings of this class that were erected. Of course, public authorities could call in assistance and advice upon the protection of any of their buildings; therefore, as far as public buildings were concerned, there was no excuse why they should be left for one day in a dangerous condition. Mr. Aldwinckle had mentioned the necessity of these buildings being run up in a great hurry, and undoubtedly it was so. It had fallen to his lot in days past to run up a small-pox hospital in forty-eight hours, but there was no reason why after the building was erected, the bricklayers should not be employed to put in partitions of 4½-inch or 9-inch brickwork. A partition of 4½-inch brickwork, if properly done, was a great protection in case of fire. As to the author's suggestion as to corridors, he (the speaker) believed that he lost his brother from having to go from the administrative block to the wards through a corridor which was not closed in. He did not think the medical officers who had to go in and out at all hours of the night, would agree that it was a matter of small moment that they had to go out of doors. He saw no reason why the corridor should not be cut up into sections. Although fire was a terrible thing, it was the smoke generated by the fire that was the difficulty and the danger, and if they could, by cutting up the corridors or building into sections by using armoured doors or brick walls, so as to make it possible for inmates to get away or the firemen to get within striking distance, they would have done a great work. They had not heard much of late about that terrible calamity at Paris, the Charity Bazaar fire, where so many ladies lost their lives. It was to buildings of that class, which were erected for charitable entertainments, that they must look for the greatest source of danger. Bazaars with flimsy draperies and stalls erected in Japanese or Chinese fashion, with lanterns, were bad enough in a permanent building, but when used in a temporary building, or a building erected of timber, they were a veritable death-trap. There was another building mentioned in the paper—the temporary building and stands erected in cases of festivities. During the past twelve months forests of timber had been erected in the streets of London. While they came out of that all right he could assure them that the anxiety of those who had to look after the protection of London from fire was considerable. One spent most of the time walking round, special people were put on to watch, and at the same time everything was done to keep from the public that watching was being done. In the case of public stands put up in a hurry by contract, unless someone was constantly watching, the joiner would leave his shavings there, the

newspaper seller would throw his contents bills there, and they would be surprised in a town how these accumulated. These were some of the dangers to temporary buildings in London. Then there were the wretched sheds at the rear of buildings, made of old egg boxes or anything that could be obtained, filled with all the rubbish that could be collected in the streets or from the houses themselves. There was much to be said from the fireman's point of view in favour of doing away with back-yards. His advice to them was to put their confidence in bricks. They would find the more they used bricks for the protection of their buildings from fire, the more successful they would be.

Mr. Hall, Cheltenham, entered a word of protest against corrugated iron serving for hospitals or for anything but storage purposes.

Mr. Cooper, Wimbledon, said the Superintendent of the fire brigade of a large American city, in issuing his report after a visit to Europe, said there was no doubt that Americans were far in advance of the Europeans in regard to their fire-extinguishing appliances; but as regarded the construction of their buildings, they were far and away behind the Europeans. That clearly bore out what Mr. Gamble had said as to the construction of buildings and brickwork. He thought if architects were more careful in cutting off the portion of the roof between the ceiling and the slates a good deal would be done to prevent the spread of fire. As regarded partitions, he was rather surprised to find that allusion was not made to wire-lathing.

Mr. J. T. Eayrs, Birmingham, said most municipal engineers had to deal with temporary buildings of one class or another in the discharge of their municipal duties. These buildings were not such as were referred to by Mr. Gamble, which were erected in brick; they were usually of wood construction, and corrugated iron was used to a limited extent. If a person put up a temporary building which under the law was exempt from the operation of by-laws, what legal remedy was there, or what power had the surveyor of a local authority to prevent the erection of such buildings, however liable to fire they might be? They were anxious about the protection of buildings in case of danger to life or property contiguous to the buildings themselves, but if they had no power he failed to see where the remedy came in. This was, however, a useful paper for temporary public buildings erected by public authorities, because there they could use such protection as they were advised by their officers.

Mr. Greeves, Buxton, said that twelve months ago he erected a temporary hospital, with two wards for twelve patients, doctor's and nurses' rooms bath, &c. It had to be put up in a hurry at the time of the small-pox scare. They spent about 500*l.* on it. He would ask what should be done with a building of that sort in order to prevent it from catching fire, or, in the event of fire, to prevent it spreading? A building put up in this manner, although called temporary, would stand for twenty years, and be a good and substantial building, and he did not think his Council would be prepared to pull the building down.

The President said he was voicing the views of the members in conveying to Mr. Aldwinckle the thanks of the meeting for the trouble he had taken. He agreed with Mr. Gamble as to the danger from bazaars. He had seen many in that Town Hall, with the large room decked out with matchboarding, festooned with light drapery, and if a fire had broken out the entire building would have been burnt down. As to the stands erected in the streets he could sympathise with the anxiety of Mr. Gamble when one portion of London was converted into stacks of firewood. If a fire had broken out it would have been almost a catastrophe. There was a considerable risk, and it must have been to the officers of the fire brigade a time of the greatest anxiety.

Mr. Aldwinckle, in reply, said he had dealt with the treatment of wood in the paper, but he had purposely refrained from noticing the name of the manufacturers. One thing was that these temporary buildings were apt to become permanent. In London they were erected under the licence of the London County Council, and those licences were renewed. There was the case of a hospital built by himself ten years ago for the London Asylums Board, with 400 beds. They had a licence for five years, that was renewed in 1898 for a further five years, which would expire this year. The lamentable fire at Colney Hatch had set everybody thinking what was to be the future of these buildings. There came in the question which Mr. Greeves asked. It was very important that they should be able to find out some practical means at a moderate cost of rendering those buildings, not fireproof, but of minimising the risk of fire in them to avoid the wholesale destruction of property.

Motor Vans for Municipal Purposes.

Mr. T. W. E. Higgins, Borough Surveyor of Chelsea, in a paper on this subject, said he was strongly of opinion that, should the cost of working motor vehicles even approximate to that of horse-drawn ones, every local authority responsible for cleansing the streets should encourage their use, both on sanitary and economical grounds. If motor vans and carts were substituted for only the horse-drawn vehicles now used for the purposes of the City and Borough Councils within the Metropolitan area, an appreciable saving in the matter of street cleansing would ensue. The first firm to bring into use a motor vehicle for municipal purposes was, as far as he was aware, the Steam Carriage & Waggon Co., of Chiswick, now known as Thornycroft's Steam Carriage & Waggon Co., who designed steam dust-carts, two of which were at once used by the Urban District Council of Chiswick, and worked for some time in that district. There was no doubt that the motor van industry was sorely crippled by the 3-ton limit. If a somewhat heavier van could be built—and it was built, and used—a much more satisfactory vehicle could be produced, and one which need not do any more damage to the road than one within the 3-ton limit. In the summer of 1900 two motor vans were built for his Authority, which had been working since, and were found to be most useful. He also had at work a steam motor van, which had a frame built to take either a tipping body or water-tank (700 gallons). This machine was one which had also proved very useful and economical. It had been in work for some two years for various persons before the author purchased it. The use of such a vehicle was greatly to be recommended, and he found that, by a simple arrangement, he could fasten a horse-broom—or, rather, a revolving broom, made originally to be drawn by a horse—to it, and thus water and sweep at the same time.

Mr. A. E. Collins, Norwich, said he had used a steam motor for some time, and when running it was an economical machine. But the constant vibration made it very difficult to keep the joints tight, and repairs meant loss of work. He found the most economical use of motor vans was for street watering, and the carrying of materials to the sewage farms. For ordinary cartage for short journeys he did not think they paid.

Mr. Cooper, Wimbledon, complained that they had not a single figure in the paper on which to found any estimate as to the economy of using motor vans.

Mr. Winter, Hampstead, said he found with the motors which he had had in work for eighteen months considerable waste of time for repairs. With his two motors it amounted to 20 per cent., which was a serious drawback. The cost had amounted to something like 70*l.* a year. He found the most advantageous use to which he could put them was street watering and the haulage of materials. He had worked out some figures as to the haulage of road metal, and he found, with the disadvantage they had suffered with heavy repairs, the cost of motor haulage was 1s. 5d. per ton, as against horse haulage 1s. 7d. per ton.

The President said he believed that with an ordinary motor they would have difficulty in getting makers to keep it in repair under 75*l.* or 80*l.* per annum, as the breakages and breakdowns were so frequent.

On the proposition of Mr. Silcock, Leeds, a vote of thanks was passed to the authors of papers; and on the proposition of Mr. Eayrs, a vote of thanks was also passed to the Mayor and Corporation of Kensington for the use of the Town Hall.

The members then proceeded in brakes to Cromwell-road, where they had an opportunity of seeing the motor doing excellent work in street watering and cleansing; to the new power-station of the District Railway now in course of erection at Lot's-road, Chelsea; and to the power-station of the London Tramways Co., where refreshments were served.

On Thursday the members were entertained to luncheon by the Mayor of Kensington; and on Friday evening the annual dinner was held in the Venetian Room at the Holborn Restaurant. On Saturday a visit was paid to the works of Messrs. Eastwood & Co., an account of which was given in our last issue.

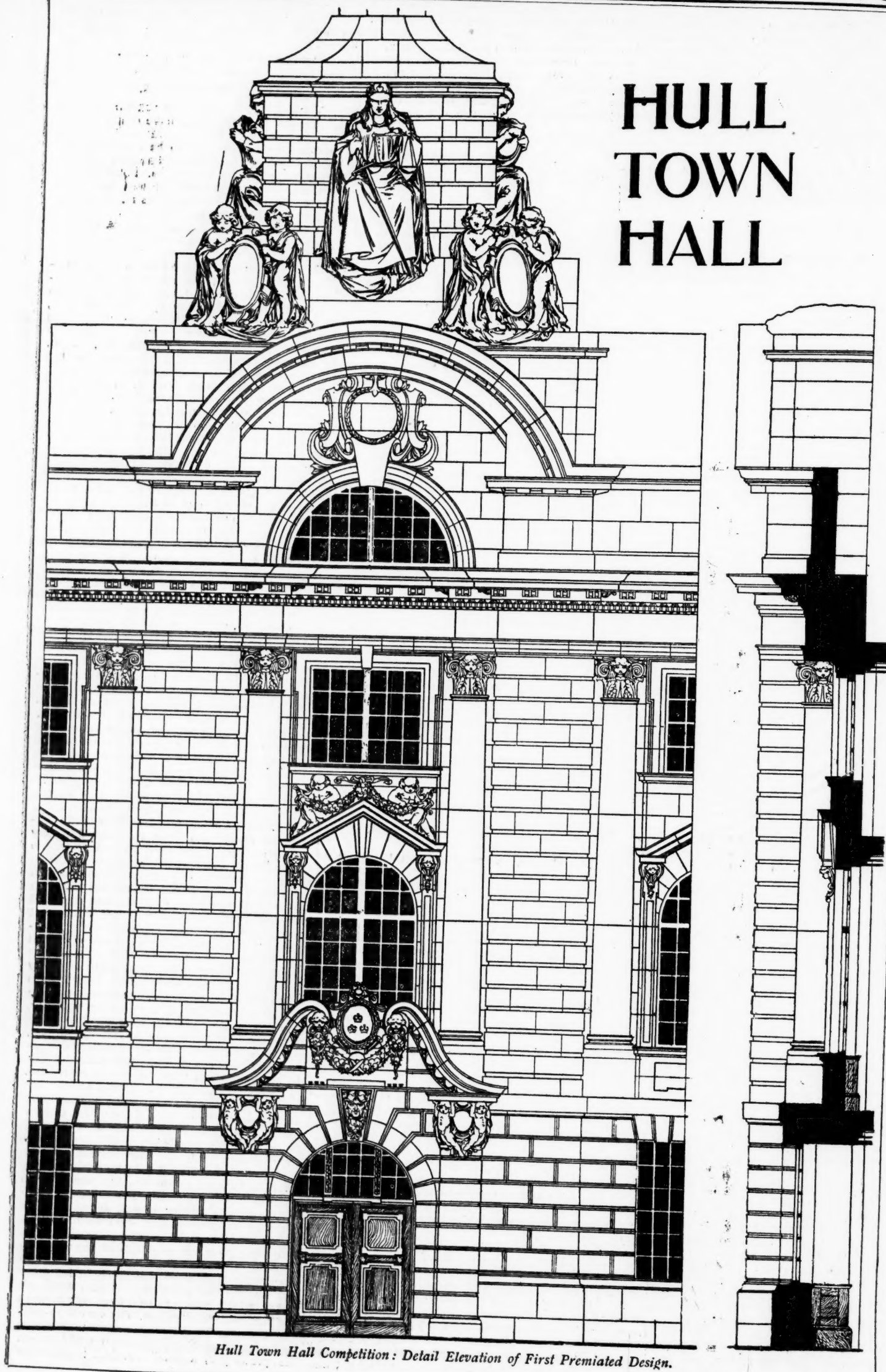
COMPETITIONS.

TECHNICAL SCHOOL, BLACKPOOL. — The Blackpool Town Council have made the following awards on the competitive designs for a new technical school to be erected on the Raikes Hall estate at a cost of about 17,000*l.*:—First premium (50*l.*), Messrs. Potts, Son, & Pickup, Bolton; second, Messrs. Cheers & Smith, Blackburn; third, Messrs. Simon & Crawford, Manchester.

ENGINEERING SOCIETIES.

THE JUNIOR INSTITUTION OF ENGINEERS.—An extra meeting of this Institution (the Chairman, Mr. Kenneth Gray, presiding) was recently held at Finsbury Technical College, when there was a large attendance of the members to hear a lecture on "High Frequency Electric Discharges," given by Mr. R. P. Howgrave Graham. The members of the Society of Model Engineers were also invited, and many of them were present. The lecturer first explained the principles of "self-induction" and "capacity," and the conditions necessary for their combination to produce oscillatory discharges of exceedingly high frequency. This was elucidated by mechanical analogies, including one based on hydraulic principles and perfected by Professor Northrup. As direct proofs, Mr. Graham spoke of the reduction of the frequency to so low a value as to cause the spark to emit a musical note, and of the measurement of the oscillation period by photographing the discharge with the aid of moving plates or revolving mirrors. The range of frequency of electric oscillations up to 30,000 million per second was briefly sketched, and as a rough guide, the figure given for most of the experiments shown was from 400,000 to 800,000 per second. Some attention was given to practical details, including sources of supply, regulation of spark gap, and the use of strip connexions to allow for the confinement of these currents to the surface layers of their conductors. The enormous effects of self-induction were demonstrated by the lighting of an ordinary 100-volt lamp short-circuited by 2 ft. or 3 ft. of ¼-in. copper rod. Equally striking induction effects were shown, including the lighting of a lamp at 7 ft. distance by the currents induced in a secondary of only three turns of rather large area, the primary being a similar coil on the opposite side of the lecture table. The lecturer emphasised the importance of syntony, and showed an experiment in which a lamp was caused to vary between darkness and extreme brilliancy, the tuning being performed by sliding a wire along an adjustable self-induction until a point was reached where the natural vibration period of the receiving circuit was identical with that of the transmitting coil a few feet away. After a demonstration of other high-frequency phenomena Mr. Graham explained that currents which would kill at ordinary periodicities could be passed with impunity through the human body at very high rates of vibration, and showed a 100-volt glow lamp worked by the current flowing through him from hand to hand. He then dealt at some length with the medical aspect of the subject, and exhibited a neat and well-arranged high-frequency medical apparatus made by Mr. Hillier and Mr. Cossor, of Farringdon-road. An account, illustrated by lantern slides, was then given of the work of Nikola Tesla and others, after which several beautiful experiments with a large Tesla coil were shown, including direct and brush discharges at very high voltages. Mr. Graham took long sparks to his body, charging it to a high alternating potential, faint glows and brushes being visible at his finger tips. These became purple tree-like discharges, ending in pale blue streamers 1 ft. long on approaching the free hand to a plate on the other coil terminal. Sparks 1½ in. long were given to members of the audience from the lecturers hands, and isolated vacuum tubes were made to glow brightly in the space surrounding the apparatus which, with all metal objects attached to it gave out brushes and streamers at all points. The very high-voltage current, after passing along a single transmission wire of No. 40 eureka flowed through the primary of a small coreless transformer

HULL TOWN HALL



Hull Town Hall Competition: Detail Elevation of First Premiated Design.

and into an insulated metal plate, there being no return wire. The secondary, of only five turns, lit a 25-volt lamp. Eventually the transmission wire was cut and the power for a smaller lamp was transmitted by electrostatic induction between two plates more than a foot apart. Mr. Graham, in speaking of the future possibilities of high-frequency work, entertained hopes that at some future time power might be successfully transmitted to a distance without connecting wires, but concluded by expressing his opinion that at present it could not be said to extend its sphere of usefulness beyond electro therapeutics and wireless telegraphy.

Illustrations.

HULL TOWN HALL COMPETITION:

FIRST PREMIATED DESIGN.

WE give this week illustrations of the design by Messrs. Russell, Cooper, & Davis and Mallows, to which the first place was awarded in the recent competition for remodelling and extending the Town Hall at Hull. The following extracts from the Report sent in by the architects with the drawing will serve to explain their intentions in the design:—

"It is proposed in this scheme to retain for the present the structure of the existing Town Hall for the following reasons:—

1. The sum of 100,000*l.* is not considered sufficient to provide all the requisite new accommodation, together with a new Town Hall, in a manner compatible with the dignity to which the city aspires.

2. A certain sentiment attaches to the present structure, built by a recognised master, and whatever value such sentiment may have it would appear a wanton act to destroy it unnecessarily, leaving aside the objections of the rate-paying public.

Having decided for the foregoing reasons that it is desirable to retain, for the present, the existing Town Hall, its arrangement in connexion with the rest of the scheme is the next consideration.

The present accommodation for the Mayor and the banqueting-room, with their lack of proper service and retiring rooms, is behind the times and would not accord with the requirements of the new building; moreover, the Mayor's room would of necessity be more or less cut off from the Council chamber and committee-rooms.

Therefore, in order to make these important rooms harmonise with the remainder of the building, it has been decided to remove them, together with their suitable accessories, into the new building.

After a careful survey of the site and its environments, it is considered desirable that the law courts should be placed at the western end of the site. Having regard to Clause 13 of the conditions, and summing up the total accommodation that it is requested should be on the ground floor for public business requirements, it is evident that the whole area of the site, paying due regard to efficient lighting and ventilation, is required for this purpose. It, therefore, is evident that the law courts and large hall must be on the first floor.

Various attempts at a suitable disposition of the accommodation required has resulted in the scheme submitted. The principal motives for this disposition are as follows:—

As the large hall is to be let for purposes other than municipal, access is required to it at such times as the offices may be closed, and, when the offices are open, without causing obstruction to the municipal work. A separate entrance from the street is, therefore, necessary to this hall. It is also essential that it should be linked with the Council suite for civic purposes.

To provide the independent access from the street without separating in any way the municipal offices, and to link it to the Council suite in a manner suitable for receptions, banquets, &c., the best position appears to be at the east end of the site, where these objects can be attained in the best and simplest manner.

The large rate office, with its independent public entrances from the street, is another important factor in the scheme, and the position in which this can be satisfactorily placed without causing congestion and noise by the public penetrating the building is also at the east end of the site.

It has, therefore, been determined to adapt the existing Town Hall to the purposes of the large hall and rates offices, by which the foregoing desiderata are achieved and the knotty question of how to deal with the structure in a satisfactory manner in its relation to the new building is solved. The adaptation of the existing Town Hall to this purpose is looked on as a more or less temporary expedient, for it naturally will fall into decay in the near future when compared with the life of the new building.

A proposed future Town Hall and rates offices is, therefore, incorporated in the design, and when erected would, with the remainder of the building, form one harmonious whole, with the large hall well defined.

Future Extension.—The present design has flat roofs to Alfred Gelder and Ann streets. Additional accommodation can be provided by building another story on this with a mansard roof to the streets. This extension is indicated on the elevations and section C C.

Heating and Ventilating.—The heating chamber indicated on the block plan would be in the nature of a tank. The system to be adopted would be low pressure gravity return steam with ventilating radiators in rooms and corridors. Fireplaces could be provided in most rooms in addition if desired. These are not shown in the plans, as they are considered a source of dirt and unnecessary labour. The building generally would be ventilated by electric fans placed in suitable positions. The whole of this work could be carried out by an expert engineer.

Materials and Construction.—The materials and construction generally would be in accordance with the building bye-laws and to the Council's approval. The walls to be carried up in brick. The external elevations to be faced with ashlar and the internal courtyards with approved brick facings and stone dressings. The floors to be of fire-resisting construction. The pitched roofs to be covered with Peake's 'Perfecta' tiles, and the flats with Seyssel asphalt. The offices to have pitch pine flooring in half batten widths. The Council suite to have hard wood floors. The vestibules, halls, corridors, public spaces, lavatories, &c., to have marble mosaic floors. The principal stairs to be in Hopton wood stone and the others in York stone. The joinery generally to be selected yellow deal, that for the Council suite in hard wood. The ceilings of Council suite to be in ornamented fibrous plaster. The walls of rooms generally to be finished according to their requirements. The plumbing to be 'heavy,' the drainage in cast iron pipes, and the sanitary appliances of the best approved types. The work generally to be suited to the demands and character of the building.

Cost.

The design has been carefully measured by a qualified surveyor. From experience of the cost of similar buildings it is considered that 9d. per foot for foundations, and 1s. per foot for the superstructure is ample, and the estimate given below is formed on this basis:—

New buildings	...	£89,668	12
Adaptation of existing Town Hall, say	...	10,000	0
Total	...	£99,668	12

A schedule of the cubic dimensions is annexed.

The cost of the future completion of the front portion of the building is estimated at 23,000*l.*, based upon the same rate as the rest of the building with tower cubed at 2s. 6d. per foot."

SOME SCULPTURE AT THE ROYAL ACADEMY.

WE give this week illustrations, from photographs lent to us by the sculptors, of some of the works in sculpture exhibited in this year's Royal Academy.

All of these were referred to in the article on "Sculpture at the Royal Academy" in our issue of June 20; we need only therefore here give their titles and the names of the artists:—

1. "The Spirit of Contemplation"; by Mr. Albert Toft.
2. "The Truth Seeker"; by Mr. Bertram Mackennal.
3. "Remorse"; by Mr. H. H. Armstead, R.A.
4. "Listen"; a portrait group of children; by Miss Edith C. Maryon.
5. "Panels from Dining Room Doors at Bradfield House, Perks"; by Mr. George Simonds.
6. "Panel for Organ Chamber—Low relief"; by Miss Ellen M. Rope.

MINIMISING THE RISK OF FIRE IN TEMPORARY BUILDINGS.*

THERE has been for some time past a growing feeling of uneasiness as to the danger from fire in connexion with buildings of a temporary character, and at the request of this Association the author has written this paper in the hope not only that it may contain a few useful suggestions on the subject, but also that it may form the basis for discussion of a practical nature.

It will be necessary at the outset to define what is meant by the expression "temporary building." It may be fairly described as a building which, being required only for temporary purposes, and having necessarily to be erected as quickly as possible—and in the majority of cases as cheaply as possible—is constructed of materials and in a manner quite different from an ordinary building, and is generally of a flimsy rather than of a substantial character: in other words, it is not built to last. These buildings are put to various uses, such as churches and chapels, lecture-halls and mission-rooms, hospitals and the like, and are all more or less of the nature of public buildings, wherein the public pass some hours in large numbers during the day, or where, as in the case of hospitals, the buildings are occupied by patients both by day and night. In all these cases it is a public duty to see that the risk of fire in such buildings should be as slight as possible. These buildings are all necessarily at variance with the London Building Act, 1894, and with the building by-laws of the provincial local authorities. In London they can be erected under licence from the London County Council, who must previously approve the plans, and the author is under the impression that the same rule holds good in the provinces. There is, however, in the model by-laws issued by the Local Government Board a special clause exempting from the operation of local building by-laws all buildings erected temporarily for the accommodation of persons suffering from dangerous infectious diseases, and this has been adopted by many local authorities in the provinces. (Of course, this does not apply to London.) Thus it happens that a good many of these temporary isolation hospitals must have been erected without any official control or supervision. Where these buildings are erected, as in London, under licence, such licences are frequently renewed from time to time, the result being that many of these buildings, originally intended to stand for a short period, and, indeed, built with that end in view, have been standing for several years. Some of those still standing are, doubtless, of a fairly substantial character, but others are undoubtedly of a flimsy nature.

The temporary building of the ordinary type may be thus briefly described:—

The external walls consist of fir quartering or light iron framing covered externally with boarding, felt, and corrugated iron, the boarding being frequently omitted. These walls rest sometimes upon brick and concrete bases and sometimes upon wooden stakes driven into the ground; occasionally the external covering consists of boarding only, without corrugated iron. The roofs consist of light iron or timber framing covered with boarding, felt, and corrugated iron, the iron being sometimes omitted and tarred felt substituted. The floors, which are of deal, rest upon fir joists on occasional brick piers, leaving an air space between the floor and the ground beneath. The internal linings to the walls and ceilings generally consist of thin match-boarding, which is either painted or stained and varnished, thus leaving an air space of about 4 in. between the inner lining and the outer covering of the walls. Thus it will be seen that the whole of the interior of the building—walls, ceilings, and floors—is lined with thin wood of necessarily a highly inflammable nature, the matter not being improved by either paint or varnish. The method of warming frequently consists of open

* A paper by Mr. T. W. Aldwinckle, F.R.I.B.A., read at the annual meeting of the Incorporated Association of Municipal and County Engineers, held at Kensington, as elsewhere mentioned.

stove in the centre of the hall or room, with an iron flue-pipe going through the roof.

Where there is more than one building, as in the case of an isolation hospital, the pavilions are generally connected by covered ways of mostly timber construction, and if there is a central system of hot-water supply and heating, the steam and hot-water pipes are laid in a subway, the floor over same being of wood. Thus we see that by the very nature of the construction of these buildings the fire is already laid, and only requires to be lighted. That when a fire *does* break out in these buildings the destruction is swift and complete we know already from the lamentable fire at the Colney Hatch Lunatic Asylum. By the courtesy of the London County Council authorities, the author was enabled to make a careful inspection of the ruins of these buildings, and as he had been responsible as architect for the erection of some nine or ten acres of temporary buildings during the past few years, he felt, as he looked upon the absolute and complete destruction of what had once been well-erected buildings, that some lessons must be learned from such a catastrophe.

As we now know what is the usual construction of these buildings, let us now consider what steps can be taken to minimise the risk of fire in the future, both as regards new buildings to be afterwards erected and as regards those now standing; and we will first of all deal with new buildings. Now it must be borne in mind that two very important considerations are involved, viz., speed and cost. To take the case of an isolation hospital, that may be required to meet an immediate outbreak of infectious disease. The whole value and usefulness of this hospital would be lost unless it could be erected in a few weeks, and a high rate of cost would be prohibitive.

The author would regard as a mistake any attempt to make these buildings fireproof in the sense that we should make an ordinary building fireproof. But a little consideration will show that it is quite possible, without a prohibitive rate of expenditure, to reduce very considerably the risk of fire, and that without delaying the erection to any serious extent. The necessary steps to be taken will undoubtedly add somewhat to the expense of building, but not so seriously as might be surmised; but this must not in the future stand in the way of the provision of reasonable safety for those who occupy these buildings. What should be aimed at are such arrangements and the use of such materials as will not admit of flame spreading from the point of contact with fire to a point out of contact with fire in the same building, and to prevent the spread of fire from one building to another.

It is not proposed materially to alter the general construction of these buildings. Considerations of speed will, as a rule, keep us to timber framing or light iron construction. (If timber framing is used this might be "treated" so as to become non-flammable. As this operation, however, costs about 2s. 6d. per foot cube, it would about double the cost of the timber.) But it will be possible to get rid of one source of danger, viz., the hollow external walls. These hollow spaces form flues and shafts for the passage of flame. There would be no difficulty whatever in filling in this space with brickwork either 3 in. or 4½ in. thick, making a solid or brick-nogged wall, which will also act as a non-conductor of heat, and thus obviate the necessity of using felt as an external covering, this being an inflammable material. In place of brickwork this space could be filled in with concrete slabs; but whatever material (of fireproof character) is used, the great point is to obtain a solid wall.

Another important point is to insist upon there being no open space between the floor and the ground beneath, as this also forms an excellent channel for the spread of fire, in which case the wooden flooring is attacked on both sides. This space should be filled up with hard core finished with a layer of coke-breeze concrete which need not exceed 4 in. in thickness, and the floor-boards should then be nailed down direct upon the concrete. The whole would then form a solid mass upon which a fire could never obtain a firm hold.

As regards roofs, we must not forget that even in ordinary buildings they are a weak spot as regards fire, and that we cannot therefore hope to do very much in a temporary building. If, as we shall presently see, the ceiling can be formed of a non-flammable material, the danger of attack from fire will be principally from the outside, unless a fire breaks out in the interior of the roof. The roof would be covered with corrugated iron, and it would be a step in the direction of safety if the boarding under the corrugated iron were "treated" so as to become non-flammable. As will be seen later on, this could be done at a moderate cost. The most important item, however, will be the internal linings of the building—that is, to the walls and ceilings. As we have already seen, this generally consists of match-boarding. There can be no doubt that these linings are the most inflammable portion of the building, and that their danger in conveying flame cannot well be exaggerated. One of the most instructive pieces of evidence given by several of the nurses at the Colney Hatch inquest was that in which they described, with almost painful realism, the deadly progress of the flames along the match-boarding of the ward in which the outbreak of fire occurred. At one stage this fire was a small one, only to develop into a great catastrophe through the means of rapid transit existing at its disposal. It is, indeed, in this respect that a radical change must be made. Whatever else may be done or left undone, a remedy for this must be found in a practical and efficient manner. There are, fortunately, ample means of dealing with this. It will be found that it will be quite possible to provide internal linings to these buildings which shall retard rather than assist the spread of flames.

In the first place, ordinary plastering is not a conductor of flame—in other words, it is non-flammable—and this would be suitable for the walls and ceilings in those cases where speed in building is not of such great importance; but otherwise ordinary plastering not only takes more time than can be spared, but it seriously interferes with the work of other trades.

There is, however, another material which fairly meets our requirements as to speed, and is certainly a non-flammable material, and that is fibrous plastering. For the purposes of a temporary building these fibrous plaster slabs can be put up by hand, and neatly jointed and then distempered, the slabs being specially prepared for such a purpose at a very slightly increased cost. These slabs can also be made more fire-resisting by the substitution of wire netting for canvas backing at a little extra cost. This material would appear to be fairly suitable for the purposes of a temporary building, as it admits of rapid fixing and is not costly. In the case of infectious hospitals it admits of all internal angles to the wards being rounded, which is very essential for good sanitation. In this connexion it should be mentioned that in issuing their licences for the temporary smallpox buildings erected last year under the direction of the author for the Metropolitan Asylums Board, the London County Council made a requirement that no match-boarding should be used internally, but only fibrous plastering or teak boarding.

Another excellent material for use as internal linings is "Uralite." This is a distinctly non-flammable material, and can be easily and speedily fixed. It requires, however, a good deal of backing in the shape of fir quartering or similar material, which adds to the cost. It does not lend itself to hospital work quite as well as fibrous plastering, but for all other purposes it is a material which has a great future before it, not by any means limited to temporary buildings. Yet another method of lining the walls and ceilings is to revert back to the match-boarding, but to have it previously "treated" so as to become non-flammable. Boarding so treated has been tested by the Fire Prevention Committee with excellent results. The cost of so treating the boarding does not exceed 16s. per square, or about 2d. per ft. super. This would appear to be a very simple and speedy method of wall and ceiling lining, and the only question is whether large quantities could be obtained in times of emergency.

The author does not suggest that these are the only materials suitable for this purpose, but has mentioned them as being representative materials for non-flammable linings. It may appear inconsistent to adopt these measures in relation to the walls and ceilings, and to ignore the doors, windows, and other joiners' work. But there is no need to be inconsistent. The whole of the joiner's work can be "treated" so as to become non-flammable. The wood is dealt with before it is glued up into doors, &c. Some idea of the cost can be formed from two instances. A 1½-in. door costs about 3½d. per ft. super, and a 2-in. door about 4½d. per ft. for "treatment." This is not a large percentage in order to obtain security. As regards the finishings to all woodwork, it is most desirable that all paint used should be of a non-flammable character, and that varnishes should be avoided. There are several good paints of this character, and they do not appear to be more expensive than other paints. It is most essential that passages and all means of inter-communication should be laid with some kind of fire-resisting material, and in no cases with deal flooring. Cement paving laid upon well-rammed hard core, not concrete, is a good and cheap material which can be easily and quickly laid. In the case of isolation hospital, the ward kitchens and linen stores should be similarly paved. There is risk from fire in both these rooms.

Temporary hospitals generally consist of more than one building, and these are frequently connected by covered ways. These should be avoided in all cases. They are of no earthly use as regards administration, and they may become the means of transmitting fire from one block to another; and the larger the number of separate buildings the greater the danger of covered ways, as tending towards a larger conflagration. It should be pointed out that under no circumstances should these covered ways, if adopted, be closed in at the sides. This is not necessary for ordinary hospital work. In the case of the Colney Hatch fire the nature of the institution and the class of inmates (insane patients) necessitated a connecting corridor closed in at both sides. Now the temporary pavilions at this asylum were 75 ft. apart, and were substantially built, and under ordinary circumstances it would have been a difficult matter for the fire to have spread from one building to another, but this closed corridor unfortunately acted as a powerful air-shaft through which the flames, starting from the first pavilion, travelled to all the other pavilions with lightning rapidity and with such complete effect that the remotest buildings were quite as completely consumed as that in which the outbreak occurred. As example is better than precept, it may be noted that at the Gore Farm Town Temporary Hospital, near Dartford, erected by the author last year for 1,000 patients for the Metropolitan Asylums Board, there are eighty-two separate buildings, but no covered ways of any kind.

In all cases where there is a central system for warming and hot water supplies the pipes of the system distributing to the several buildings should be laid in brick ducts, covered with fireproof material. On the same principle all heated chambers in the basement should be protected with a fireproof floor over the same. The use of the wooden joists and flooring over pipe ducts and heater chambers is exceedingly dangerous, as after a time the wood from its proximity to hot pipes has become so dry that it is highly inflammable.

Generally speaking, it is most desirable that temporary buildings should be erected in as substantial manner as the time will admit, and it will be found the truest economy to follow this principle in the majority of instances. That it is quite possible to erect buildings in a very short time and in which fairly non-flammable conditions may exist, the author would refer as illustrations to the Mead ambulance station at Fulham, the smallpox wards and receiving station at South Wharf, Rotherhithe, and the new buildings at the Gore Farm Upper Hospital, Dartford, erected under his direction for the Metropolitan Asylums Board, in connexion with the smallpox outbreak of last year, at a cost of 100,000*l*. These were all built in twelve weeks. There is the ordinary timber framing to the walls and roof, covered with corrugated iron, but the internal linings to all walls and ceilings are of fibrous plastering or teak; all subways, pipe ducts, and basements are of fireproof construction; all corridors have fireproof floors, and all staircases are of teak. If this work had to be done at the present time it is probable that, in the light of recent events, the external walls would be made solid in the manner already described, but no other alterations would be necessary.

So far as regards existing temporary buildings, the matter is somewhat important, as they are so numerous. Some of these are of so flimsy a character that common prudence would suggest their immediate demolition, but there are many of these buildings which could be rendered less inflammable without

incurring a large expenditure; so that one of two things should be insisted upon: either the buildings should be rendered safe, or they should cease to exist.

The first and most obvious remedy is to remove the whole of the internal wood linings; then, if funds admit, the external walls could be made solid in the manner already described. In any case, all the new internal linings should be of one of the non-flammable materials already mentioned. If this be done, the risk of fire will have been very considerably reduced, as the danger of fire to these buildings is from within rather than externally. The whole of the doors, windows, and other internal joiner's work should also be painted with a non-flammable paint, the existing paint, if any, being previously burnt off.

THE ARCHITECTURAL ASSOCIATION.

THE following is the Prize List of the Architectural Association for session 1902-1903:—

A.A. Travelling Studentship, value 25l., and Silver Medal.—A. G. MacNaughtan.

Second Prize, value 5l.—Vincent Hooper.

A.A. Medal, value 10l. 10s.—A. A. Carder.

Second Prize, value 5l. 5s.—L. G. Detmar.

Banister Fletcher Bursary, value 25 Guineas, and Medal.—J. Gillespie.

Hon. Mention.—A. A. Reeve.

A.A. Scholarship, value 4l. 4s.—T. W. Watkins.

Studio. Division I.—C. R. Pinsent (drawings of old work, book prize, and volume of A.A. Sketch-book). T. A. Jaques (study of ornament, book prize, and volume of A.A. Sketch-book). G. F. Royds (general work, book prize, and volume of A.A. Sketch-book).

Studio. Division II.—T. J. Tatham (drawings of old work, book prize and volume of A.A. Sketch-book). J. F. Schneider (study of ornament, book prize, and volume of A.A. Sketch-book). J. V. Gibberd (general work, book prize, and volume of A.A. Sketch-book).

Order of Merit. Lectures. Division I.

Greek and Roman Orders.—1. J. H. Markham (book prize). 2. A. T. Groves. 3. T. W. Watkins.

Classic Ornament.—1. B. Chaikin (book prize). 2. A. Binning. 3. J. H. Markham.

Elementary Construction.—1. B. Chaikin (book prize). 2. A. T. Groves. 3. T. W. Watkins.

English Architecture.—1. C. R. Pinsent (book prize). 2. J. H. Markham. 3. T. W. Watkins.

Mediæval and Renaissance.—1. R. C. Foster (book prize). 2. S. W. Hill. 3. T. S. Atlee.

Elementary Physics.—1. T. W. Watkins (book prize). 2. R. C. Foster. 3. H. H. Whittington.

Plane and Solid Geometry.—1. T. W. Watkins (book prize). 2. B. Chaikin. 3. G. P. Bowie.

Lectures. Division II.—Materials.—1. E. Gunn (book prize). 2. A. Potter. 3. D. Anderson.

Construction.—1. E. Gunn (book prize). 2. D. Anderson. 3. J. V. Gibberd.

Drainage and Water Supply.—1. E. Gunn (book prize. 2. H. W. Currey. 3. D. Anderson.

Ventilation, Lighting, and Heating.—1. H. W. Currey (book prize). 2. E. Gunn. 3. W. S. Dakers.

Professional Practice.—1. E. Gunn (book prize. 2. H. W. Currey. 3. R. E. Stewardson.

Land Surveying.—1. E. Gunn (book prize). 2. J. R. Hobson. 3. H. W. Currey.

SANITARY INSTITUTE CONGRESS.

THE proceedings of the twenty-first Congress of the Sanitary Institute, held at Bradford this year, began on Tuesday, with a reception of members at the Town Hall by the Mayor, Mr. Alderman Wade. Among the leading delegates and members presented were the President of the Congress (the Earl of Stamford), Sir F. Sharp Powell, M.P., the delegate of the French Minister of Instruction, Dr. Ménard of the Académie de Médecine, the Chairman of the Council of the Sanitary Institute (Mr. W. Whitaker), the Secretary (Mr. E. White Wallis); Messrs. Searles-Wood, T. W. Aldwinckle, Edwin T. Hall, W. Kaye Parry, T. H. Yabbicom; Drs. Collingridge and Hill, and many of the leading delegates of municipalities, who in all number nearly 700.

Following the reception, a public luncheon was given at the Municipal Technical Institute, over which the Mayor presided; the Earl of Stamford, Sir F. S. Powell, Mr. Wm. Whitaker, and other leading members proposing toasts or replying for them.

At three o'clock the Mayor of Bradford and his principal guests adjourned to the Belle Vue Volunteer Barracks for the opening of the Health Exhibition of inventions, sanitary apparatus and appliances, formed in the Drill Hall. The exhibition having been formally opened by the Mayor, a preliminary list of awards to exhibitors was read by Mr. Searles-Wood, Chairman of the Committee of Judges. In the course of the proceedings, the Earl of Stamford urged the Corporation of Bradford to imitate the splendid example set by Pittsburgh and Boston in America and start a mighty crusade against the smoke nuisance. The carbon, which was worse than wasted ought to be turned to much better use than the disfigurement of the landscape and the spoiling of the air.

In the evening, Lord Stamford delivered his inaugural address at the Municipal Technical School to a large gathering of members. The President recognised the efforts of the Sanitary Institute to keep pace with the enormous strides made by hygiene since the formation of the Institute in 1876, and the fact that under its auspices last year meetings were held to the number of over 500, with a total attendance of more than 50,000 persons. Immense as had been the advancement of scientific knowledge during the past half century, we were still only standing on the threshold of the great health questions. Daily we were recognising more and more clearly that the foes of health could only be combated by the organised application of scientific and economic principles, by the co-ordination of public and private enterprise, and especially by the more complete education of the working classes themselves as to the importance of living in healthy homes. For a full understanding of the housing question, the perusal of Alderman Thompson's recently published handbook on "Housing" was strongly urged. In great cities like London, Glasgow, Liverpool, and Manchester, serious steps had been taken to cope with this question, and not the least important of the schemes was one that Bradford was working out, which would cost no less a sum than 83,000*l.* to complete. Among the important problems that were forced upon them was the rural housing question, but he would do no more than refer to the suggested remedies of collective ownership by municipalities and co-operative societies, and of State aid by way of cheap loans. There was a tendency for building enterprise to pass from private hands to municipalities or the State in consequence of increasing stringency in building rules and sanitary laws. The Rural Housing Association and kindred bodies were seeking to stimulate public interest in England in the improvement of labourers' dwellings, as to which the law here was far behind that of Ireland, where already under the new Labourers' (Ireland) Acts something had been done by the erection of 15,000 cottages. The importance of teaching hygiene in schools, of securing hygienic conditions in factories and workshops, improved methods of treatment for sewage and trade effluents, and the recommendations of the Sewage Commission in its recently-issued Report were among the other matters touched upon by Lord Stamford, who, in concluding his address said, "My connexion for the last two years with the Metropolitan Asylums Board has proved to me that a desirable combination can be made to work most smoothly and efficiently. Again I would impress upon you, the advocates of sanitary progress, that the first duty which lies before you is to advance the general intelligence of the nation to a just appreciation of the supreme value of its chief asset—public health."

The Conferences.

Among the eight conferences before which the discussions of Wednesday took place, the most important was that of "Engineers and Surveyors to County and other Sanitary Authorities," presided over by Colonel Yabbicom, M.I.C.E., ex-President of the Association of Municipal and County Engineers. After acknowledging the great help that had always been extended by the Sanitary Institute to the borough engineer and surveyor, the President of the Conference said there was an intimate partnership between their Association and the Sanitary Institute, but it was well for the partners to recognise from the outset that each had his own separate sphere without interfering with the other. The surveyor had to carry out works for his Council and to superintend other works constructed by private individuals under the by-laws approved by the Council; he was responsible for the efficiency of their construction and for their maintenance in future years. As it was his duty to examine and report on the plans submitted for new buildings and for alterations of the structure or drainage of old ones, so it was his duty to see these plans properly carried out. The Local Government Board had been memorialised by certain sanitary inspectors to make it the duty of inspectors to superintend the construction of house drains. This seemed to indicate a desire on the part of certain ill-advised persons to usurp the functions of others, and each member of the Association of Municipal and County Engineers, he thought, should take every opportunity of crushing in the bud any attempt to interfere with his obvious duties, as he, and he alone, was responsible.

The only other question referred to in the President's address was the problem of providing suitable dwellings at reasonable rentals for those now lodged in unhealthy tenements with sordid surroundings. It might be assumed that the clearing away of unhealthy slums was a public benefit, and that therefore the cost of providing dwellings for those who had been unhoused was a legitimate charge on the public funds. An improved state of health must result in an improved condition of the mind, a sense of greater satisfaction with things in general, and better ability to perform work. The misfortune was that, for reasons only too well known to all sanitarians, only a small proportion of the unhoused found habitations in the new dwellings, which soon became occupied by a better class of persons than those for whom they were intended.

Papers were laid before the Conference on "Bradford City Tramways and Electric Traction;" the first by Mr. T. H. Cox, M.Inst.C.E., City Surveyor of Bradford, and the second by Mr. C. J. Spencer, A.M.I.E.E. The earliest tramways in Bradford, started in 1882, were mainly worked by steam haulage, horse traction being only found practicable on one comparatively level section. In 1898, after careful comparison of the results attained with various systems of electric traction, Bradford adopted the overhead-trolley system. At the present time the Bradford Tramways extended to over forty-three miles of line, mostly in double track or a length of nearly seventy-five miles of single track. The overhead equipment is of the usual kind, but centre poles are not considered advisable in streets less than 45 ft. wide. In Bradford the tramway tracks are paved with 3-in. by 6-in. granite setts, except in a few streets near the centre of the city, where Australian hardwood blocks have been used. With regard to speed, which was formerly limited to nine miles an hour as a maximum, this has been raised to twelve miles an hour by the Board of Trade, after inspection, on an application by the Bradford Corporation. On narrow roads the speed is still limited to nine miles per hour. In conclusion, the City Surveyor said that electric tramways had now become serious competitors with railways for urban and inter-urban traffic, and railway companies would have to depend more on their long-distance traffic for their revenue in future. The railway companies in the West Riding of Yorkshire, as in other populous districts, had been seriously affected by the great increase in electric tramway traffic during the last few years, and to all appearances it was likely to increase still more rapidly than ever.

Mr. Spencer's paper dealt chiefly with cost of working, maintenance, and the traffic arrangements. The average distance run for 1d. is two miles, but before 8 a.m. a universal 1d. fare for any distance has been adopted.

The third paper before the Conference described the "Gamewell Fire-alarm" system adopted in Bradford, which had given satisfactory results. It has now been at work for twelve months, and is found to be considerably quicker in operation than sending an alarm by public telephone.

A paper on "Cement Joints for Drains, and Drain-testing" was read by Mr. J. G. D.

Armstrong, and "A Defence of the Disconnecting Trap" by Mr. William Ransom.

In the discussion which followed the reading of Mr. Spencer's paper, Mr. Alderman Adcock (Dover) asked whether anyone present could give him any information as to the wear of tramway rails. A great many corporations who had started tramway schemes appeared not to have had due regard to the short life of rails, and had not set aside sufficient sums to provide for the renewal of them at the end of from ten to fifteen years. His own corporation had laid down tramlines five years ago, and up to the present had not set aside a single penny to renew the rails. They were satisfied with keeping the cars and rails up to date. He had pointed out that in ten years' time they would have to find the money to pay for new rails, and the question had been referred to the town clerk and the surveyor. It was estimated that in ten years' time they would have to spend 4,000*l.* per mile on the tramway. At present they were setting aside 10 per cent. in relief of the rates, and they were thus spending the money that should have been used to provide for the inevitable depreciation.

Mr. James Lemon (Engineer of Southampton) referred to the paragraph in Mr. Cox's paper in which the difficulty was mentioned of the rising of the wood blocks through water getting into the open end spaces, and the tendency to lift observed in the blocks adjacent to the rails. He advocated leaving a greater space upon the end blocks. He would prefer to set the wood blocks close in the middle portions, with greater space left at the open ends. He endorsed the remarks of the previous speaker that in many instances not enough was set aside for depreciation.

After some remarks from Mr. Arthur Smith (Dartmouth) the President of the Conference wound up the discussion. He referred to the paragraph of the paper stating the terms on which the Bradford Corporation had acquired the lease of the Shipley tramway. He had come to the conclusion that Shipley had made a good bargain. The City Corporation had paid 1⅜d per unit to Shipley for use over the Shipley line, and the electricity over the other portion only cost 1d. per unit. Thus Shipley appeared to be making a good profit.

Mr. W. H. S. Dawson (hon. secretary), in the absence of the author of the paper, said, in reply to Alderman Adcock, that it was most important that an adequate sum should be set aside for depreciation. The Bradford tramways were in 1882 steam trams, and were leased by the Corporation to a company for twenty-one years at the rate of 290*l.* per mile per annum, which represented 6⅔ per cent. upon the capital expenditure, but the line was completely worn out in fourteen years, and they had to put in new rails for the benefit of the Company. Mr. Cox had put the life of the tramway lines for straight road with heavy traffic at eight years. With regard to the Shipley lease, it was the fact that Urban Councils always seemed to get the better of the city. The cost of electricity over the Corporation lines was on the average 1⅛d. per unit, the difference between that and 1⅜d. being the profit obtained by Shipley. The conference shortly afterwards adjourned.

[Our report will be continued next week.]

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens.

Loans.—On the recommendation of the Finance Committee, it was agreed to lend Battersea Borough Council 3,019*l.* for electric-light installation, and St. Olave's Union Guardians 39,000*l.* for cottage homes.

Electrification of Tramways.—Two Reports of the Highways Committee, dealing with the London tramways, were discussed at great length. One was the joint Report by the Chief Engineer and the Tramways Manager showing the relative cost of the two systems of electrical traction, conduit and overhead, and the difference in the cost of maintenance, as regarded each system. It was shown that the cost of the conduit system was about 33·13 per cent. more than the overhead system. The second Report dealt with the system of electrical traction to be adopted for various portions of the tramways north of the Thames, and it was recommended that twenty-six miles in the more central parts should be installed on the conduit system, while about twenty-eight miles should be installed on the overhead system.

Mr. Sidney Low said the officers who had reported had pointed out eleven or twelve grave disadvantages which were against the adoption of the conduit system. There was, first, the enormous disturbance of the streets in the construction, and there were certain portions of London where the system could hardly be constructed at all. Then they had constantly exceeded the estimate, and further disadvantages were the liability of flooding in great storms or of congestion in the case of a snowstorm and the difficulty of cleaning. Finally, came the great question of cost. There were about 100 miles of tramway in existence in London, and the difference in cost by adopting the conduit system was no less than 1,300,000*l.* Mr. Benn, however, thought there should be 1,000 miles of tramway in London, and if they were constructed on the conduit system as against the overhead system, it would cost the ratepayers something like 7,000,000*l.* more if they accepted the lowest estimate. Before an elaborate conduit system could be adopted ten or twenty years must elapse, and they had no guarantee that the system would not then be as obsolete as horse-traction. He would not be surprised if in five years they would require neither the conduit nor overhead system, in consequence of the tramway carrying its own accumulator. Therefore, they ought to sink as little capital in rails and wires as possible, for if in a few years they had to scrap the tramway system, it was better to scrap 7,000*l.* a mile than 14,000*l.*

Mr. Strauss pointed out that they must go on with the conduit system, as the Borough Councils would not allow their streets to be disfigured with the wires and posts.

Mr. A. Baker said that in Chicago they were laying down the conduit system to sweep away the overhead system. With regard to the disturbance, when once the construction was done with the disturbance was over, which was not the case with the overhead system. As to flooding, the recent experience had shown that the conduits were not affected. Then with the overhead system danger was ever present, for the breaking of a live wire meant the death of any one coming into contact with it. There was also great danger from electrolysis to the gas, electric-lighting, and other mains from the leakage of the returning current on the overhead system, which might involve London in enormous expense. On the question of cost, it had to be remembered that the first cost was always the greatest, and the system was being adopted for the central streets. When they got further out the cost would not be so great. He contended that the Council had made no mistake in adopting the conduit system.

Mr. Torrance remarked that the people in his constituency looked with dismay on the idea of the overhead system being adopted in North London. He felt that the streets of Glasgow had been utterly disfigured by the overhead tramway system.

The first Report was then agreed to.

After further discussion all the recommendations relating to the electrification of twenty-six miles of tramway on the conduit system in the North of London were agreed to. The recommendations with regard to the reconstruction of twenty-eight miles of tramway on the overhead system were adjourned for a week.

The Works Department.—The half-yearly return of the Works Committee, covering the cost of works completed by the Works Department during the half-year ended March 31 last, was then considered. The Report disclosed several large losses, but these are mainly in connexion with the erection of Horton Asylum, Epsom, and the matter has already been discussed in the Council. The return deals with twenty estimated works, the final estimate for which was 591,790*l.*, while the actual cost has turned out to be 638,534*l.*, or a balance of cost above final estimate of 46,744*l.* On only four of the works is any excess of cost over estimate shown, but in these cases the excess is 56,535*l.* The cost of the building of the superstructure of the Horton Asylum has exceeded the estimate by 37,878*l.*, the final estimate being 291,165*l.* and the actual cost 329,043*l.* The erection of a central electric-lighting station for the same asylum has resulted in an excess of cost over estimate of 1,977*l.* on a job estimated to cost about 14,000*l.* The provision of an "epileptic colony" on the Horton estate, as an adjunct to the asylum, has resulted in a balance of cost above estimate of 5,018*l.* The other loss, which amounts to 11,617*l.*, is on the construction of the Hackney Wick relief sewer. This work was estimated at 125,329*l.* and has actually cost 136,946*l.* With regard to this work, the Committee do not think that the ultimate cost is excessive, having regard to the difficulty of estimating accurately. A great deal of difficult work was encountered, and much pumping was necessary. The remaining sixteen works embraced in the return all show a balance of cost below estimate, the aggregate saving amounting to 9,791*l.* The jobbing works executed by the Committee during the half-year have resulted in a balance of cost below schedule value of 1,334*l.* In concluding their Report the Committee state that the number of works referred to them for execution and not included in the present return is forty-one, representing an estimated expenditure of, approximately, 739,000*l.*, but they do not anticipate an excess of cost over accepted estimate in respect of any works where the accepted estimate is over 1,000*l.*

Mr. E. White said they all deplored the serious losses which had occurred, and he was not sanguine that there would be much improvement in the future. To account for the losses the Committee put forward various excuses, such as labour troubles, &c., but had the Council given its work to contractors, the contractors would have borne all the loss. The Council had not yet heard from the Committee how many bricks per man per day were laid by the Council's bricklayers, and if it were true that only some 300 or 400 were laid, that would account for a good deal of the loss. He knew works on which 2,000 bricks per man were being laid per day under proper conditions of labour. There had been a loss up to date of 108,000*l.* They would be told that there had been a profit on the jobbing work, but that was because 16½ per cent. had been added to the schedule. That was how a profit of 10 per cent. was made on the jobbing work.

Mr. Fletcher referred to the number of bricks laid per day, and said he knew contractors whose men easily lay 800 bricks per day per man.

Mr. Torrance, Chairman of the Works Committee, said that the Department, under the present Committee, had made a profit of 10,000*l.*—the losses had nothing to do with the present management: the present Committee had not as much to do with the losses as, say, Mr. White had. Even where the losses had been sustained satisfactory explanations could be given, and if the cost was high in some cases, the work was very good. The Council, in their desire to have a department to check the contractors, desired to pay the best rate of wages to its men and get the best work and the best results, and they were determined to insist on that. As far as he knew, not a single loss had been made by the present Committee. There were good contractors and bad contractors, but in the main the London contractors did their work as well and as fairly as the Department did, but the Council wanted to have a department they could control.

The excess votes were then agreed to.

Housing.—The Housing Committee reported as follows:—

"Redman-buildings are the dwellings to be erected on the Bourne estate, fronting Portpool-lane, the foundations of which have been constructed by the Works Department. For convenience in building we have divided these dwellings into four sections, and we now submit working drawings for the first and second sections, specification for the whole work, and bills of quantities for the second section, together with an estimate of 31,582*l.* in respect of the whole work, including provision for architect's expenses, cost of supervision, quantity surveyor's charges, articles to be bought direct and incidentals. We may add that the architect's estimate for the building only of the second section, based on the bills of quantities, amounts to 10,000*l.* We have been in negotiation with Mr. H. L. Holloway, who built Shene, Skipwith, and Ledam buildings on this estate, with a view to ascertaining whether he would be prepared to build Redman-buildings at the schedule of prices contained in his contract for those buildings. As a result, Mr. Holloway, in consideration of being entrusted with the additional work of building Redman-buildings, has agreed with the architect to accept this schedule of prices, with a reduction of 266*l.* on the estimate on that basis for the whole of the buildings. We are of opinion that the practical continuance of Mr. Holloway's contract for the work now in question will result in a saving to the Council in point of time, and that the terms offered by him are such as the Council may accept with advantage. Owing to the savings effected on the architect's estimate on the contract for Shene, Ledam, and Skipwith buildings,

and to the savings so far effected by the Works Department, amounting, we understand, to over 5,000*l.*, we have every reason to anticipate that the development of the whole estate will be eventually completed in compliance with the standing orders."

The Committee recommended accordingly, and the recommendation was approved.

They also reported as follows :—

"From the returns of works in hand, particulars of which were submitted to the Council on May 12, 1903, it will be observed that there were in hand at that time building works alone to the value of 352,670*l.* Since that date works to the value of 117,933*l.* have been commenced, and the drawings for works to the value of 118,880*l.* have been completed, making the total value of works in hand and about to be put in hand no less a sum than 589,483*l.* We desire to draw the attention of the Council to the magnitude of this amount, and to the hard work and devotion to duty which it represents on the part of the officials concerned, particularly those of the housing section of the architect's department, since the greater part of the work has been prepared ready to put in hand during the past twelve months."

Improvements: Denmark Hill and Lordship-lane Widening; and Narrow-street Widening.—The following recommendations of the Improvements Committee were agreed to :—

"That the estimate of 119,900*l.*, submitted by the Finance Committee, be approved, and that the Improvements Committee be authorised to incur expenditure on capital account up to 119,900*l.* in respect of the widening of Denmark Hill, Champion Park, Grove-lane, Dog-kennel Hill, Grove-vale, and Lordship-lane, authorised by the London County Council (Tramways and Improvements) Act, 1902, in connexion with the construction of a tramway from Camberwell-green to Lordship-lane."

"That the estimate of 2,000*l.*, submitted by the Finance Committee, be approved; that the Council's statutory consent be given to the widening of Narrow-street, at Nos. 31, 32, 33, and 35, proposed to be undertaken by the Stepney Borough Council in accordance with the plan submitted by the Borough Council with its letter dated December 16, 1902; and that a contribution be made by the Council on the usual conditions of one-third of the net cost of the improvement, provided, however, that if the net cost of the improvement exceeds 6,000*l.*, the Council's contribution shall be limited to 2,000*l.*"

Vauxhall Bridge — Superstructure. — The Bridges Committee reported as follows :—

"The Council on November 25, 1902, approved an estimate of 170,000*l.* for the superstructure of the new Vauxhall Bridge, and on May 19 last also approved a supplemental estimate of 22,690*l.* which was necessitated in consequence of the alteration of the design of the bridge. The plans and specification upon the lines of the new design have now been prepared. In connexion with this we desire to state that we have had under further consideration our recommendation that a clause should be inserted in the specification requiring that the steel and iron used in the construction of the bridge should be of British manufacture only, which matter was referred back to us by the Council on June 23, and having regard to the opinion expressed by the Council, have decided to omit any such clause. We have, however, given instructions for steps to be taken which will, we hope, ensure that fair wages and hours of labour will be granted to employees if the contract or any part thereof is let to a Continental firm. The contract for the piers and abutments of the bridge is approaching completion, and no time should therefore now be lost in entering into a contract for the superstructure. We suggest, therefore, that advertisements should be issued inviting tenders for the work to be sent in by the first meeting of the Council in October. We recommend—'That the specification, plans, &c., for the construction of the superstructure of the new Vauxhall Bridge be approved, and that advertisements be issued inviting tenders for the work.'"

The recommendation was agreed to.

Wooden Structures.—On the reception of the Report by the Building Act Committee, Sir William Collins asked who was responsible for the erection of some temporary wooden structures in St. Giles.

Captain Hemphill replied that the Borough Council was responsible; the London County Council would never have agreed to their erection.

The Council adjourned soon after 7 o'clock.

PRESENTATION TO AN ASSISTANT SURVEYOR.—Mr. Herbert Beeney, architect and surveyor, has been presented with a level, tripod, and staff, on the occasion of his resigning the post of Assistant Surveyor to the Barking Town Urban District Council, in order to commence private practice. Mr. Beeney received his professional education in the office of the Borough Engineer of Guildford.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses :—

Erection of Office Building, Parnell-road, Bow.

Bow and Bromley.—That the seal of the Council be affixed to a duplicate of the deed of covenant entered into by Messrs. Mallinson & Co., with reference to the erection of an office building at Parnell-road, Bow, with the boundary fence at less than the prescribed distance from the centre of the roadway of Parnell-road.—Agreed.

Lines of Frontage and Projections.

Marylebone, West.†—A porch to No. 26, Manchester-square, St. Marylebone, to abut upon Hinde-street (Messrs. Harrod's, Ltd., for Lady Lyster Kaye).—Consent.

Lewisham.†—A two-story house on the north side of Gabriel-street, Honor Oak Park, Lewisham, to abut upon the east side of Ballina-street (Mr. J. P. Choat for Mr. A. J. Geeves).—Consent.

Hampstead.†—Buildings with bay windows on a piece of land on the north-east side of Finchley-road and north-west side of Platt's-lane, Hampstead, so far as relates to the erection of the westernmost house in Platt's-lane (Mr. Eiloart for Mr. G. W. Hart and Dr. H. Peake).—Consent.

Strand.—An oriel window at the ground, first, and second floor levels of the Royal Ear Hospital, Nos. 42 and 43, Dean-street, Soho (Mr. A. O. Collard for the Committee of the Hospital).—Consent.

Chelsea.—A bay window at the basement, ground, first, and second floor levels, and a balcony at the first floor level, of No. 91, Sloane-street, Chelsea (Messrs. Mullett, Booker, & Co. for Mr. J. T. Smith).—Consent.

Clapham.—Three houses with bay windows on the east side of Queen's-road, Battersea, the southernmost house to abut also upon Broughton-street (Mr. J. S. Cooper for Mr. W. H. Atkinson).—Consent.

Kensington, North.—One-story shops in front of Nos. 114 and 116, Westbourne-grove, and three houses with shops on the west side of Richmond-road, Kensington (Mr. G. A. Sexton for Mr. A. Woollard).—Consent.

Kensington, South.†—The retention of an illuminated sign at the Kensington Arms public-house, Warwick-road, Kensington (Mr. T. H. Smith for Mr. N. Foley).—Consent.

Lewisham.—Buttresses to a church on the south side of Sandhurst-road, Lewisham, eastward of Torridon-road (Mr. P. A. Robson).—Consent.

Lewisham.—A two-story porch addition in front of a block of residential flats on the north side of Sydenham Park, Lewisham, eastward of Sydenham Park-road (Mr. H. G. Leslie).—Consent.

St. George, Hanover-square.—A porch at the entrance to the Oriental Club, No. 18, Hanover-square, St. George, Hanover-square, to abut upon Tenterden-street (Messrs. T. H. & A. M. Watson for the Chairman and Committee of the Oriental Club).—Consent.

Wandsworth.—That the application of Mr. F. Perks on behalf of Mr. R. Simpson for an extension of the period within which the erection of houses with one-story shops on the site of The Hawthorns and grounds on the west side of Balham High-road, Wandsworth, at the corner of Marius-road, was required to be completed, be granted.—Agreed.

Lewisham.—A one-story addition at the flank of No. 51, Wellmeadow-road, Lewisham, to abut upon Torridon-road (Mr. J. Lawrence for Dr. W. J Brown).—Refused.

Poplar.—A two-story building on the western side of Manchester-road, Poplar (Messrs. J. & S. F. Clarkson for Messrs. Yarrow & Co.).—Refused.

Wandsworth.—A wood, brick, and tile porch to "Narford," Lyford-road, Wandsworth, to abut upon Herondale-avenue (Messrs Holloway Bros. for Mr. C. J. Byworth).—Refused.

Whitechapel.—A projecting advertisement sign at No. 46, High-street, Whitechapel (Messrs. Gardiner & Co., the Scotch House, Ltd.).—Refused.

Width of Way.

Camberwell, North.—Three houses on the eastern side of the street at the rear of Havil-street, Camberwell, leading from Ada-road to Elminton-road, Camberwell (Mr. S. W. Wells for Mr. A. Burton).—Consent.

Hampstead.†—A one-story building in the playground of Heath Mount School, Heath-street, Hampstead, with external walls at less than the prescribed distance from the centre of the roadway of the Grove (Mr. J. D. Hunter for Mr. J. S. G. Grenfell).—Consent.

Marylebone, West.—Working-class buildings upon the site of No. 9, Paradise-place, St. Marylebone (Messrs. T. H. & A. M. Watson for the Portland Industrial Dwellings Co., Ltd.).—Refused.

Width of Way and Lines of Frontage.

Woolwich.—Re-erection of Nos. 79, 80, and 81, Wellington-street, Woolwich, abutting upon Upper Market-street, with external walls at less than the prescribed distance from the centre of the roadway of Upper Market-street and one-story shops abutting upon Wellington-street (Mr. H. P. Monckton for Lieut. R. L. A. Ogilby).—Consent.

Marylebone, East.†—The retention of an iron and glass shelter at the rear of Nos. 278-288, Oxford-street, St. Marylebone, to abut upon Cavendish-buildings (Mr. T. E. Collcutt for Mr. J. Lewis).—Consent.

St. Pancras, West.—An iron and glass shelter at the entrance to No. 24, Cumberland-terrace, Regent's Park, St. Pancras (Messrs. J. Shoolbred & Co. for Mrs. Etlinger).—Refused.

Space at Rear.

Newington, West.—A modification of the provisions of Section 41 with regard to open spaces about buildings so far as relates to the proposed erection of a building at No. 215, Borough High-street, Newington, with an irregular open space at the rear (Messrs Willis & Leslie for Mr. F. H. Barker).—Consent.

Paddington, South.—A modification of the provisions of Section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of an addition at the rear of Nos. 413 and 415, Harrow-road, Paddington, to abut upon Fermoy-road (Mr. W. Daniell for Messrs. E. Wheatland & Sons).—Consent.

Peckham.—A modification of the provisions of Section 41 of the Act with regard to open spaces about buildings, so far as relates to the proposed erection of two houses on the north side of Peckham Park, westward of the Peckham Park Mission Hall, with an irregular open space at the rear (Mr. E. Crosse for Mr. W. Barbut).—Consent.

St. George, Hanover-square.—A modification of the provisions of Section 41 of the Act with regard to open spaces about buildings, so far as relates to the proposed erection of a bathroom and water-closet addition at the rear of No. 6, Eaton-terrace, St. George, Hanover-square (Mrs. M. S. Lidyard).—Consent.

Lines of Frontage and Space at Rear.

Hackney, North.†—A house on a site abutting upon the south side of Cazenove-road, and west side of Geldestone-road, Hackney, with bay windows and porch, and an open space about such house (Mr. G. R. Woodruff).—Consent.

Fulham.—Two blocks of flats on the west side of Palliser-road, Fulham, southward of Margravine-road, with bay windows and porches, and with open spaces at the rear of such flats (Messrs. Leslie & Co., Ltd.).—Consent. (Consent to the erection of the balconies refused).

Line of Frontage and Construction.

Lewisham.—A wood and iron school building and four water-closets on a site on the east side of Wellmeadow-road, Lewisham, northward of Hazelbank-road (Mr. T. J. Bailey for the School Board for London).—Consent.

Width of Way and Space at Rear.

St. George, Hanover-square.—A building upon the site of Nos. 20 and 22, Maddox-street, St. George, Hanover-square, with external walls at less than the prescribed distance from the centre of the roadway of Pollen-street, and with an open space at the rear of such building (Messrs. W. Bartleet & Son for Mr. W. E. Davis).—Consent.

Whitechapel.—Dwelling-houses upon the site of Nos. 32 to 48 (even numbers), inclusive, Pelham-street, Whitechapel (Mr. J. R. Moore-Smith for Mr. J. Donn).—Refused.

Deviation from Certified Plans.

St. George, Hanover-square.—Deviations from the plan certified by the District Surveyor, under Section 43 of the Act, so far as relates to the proposed erection of an addition at the rear of No. 68A, Piccadilly (Messrs. G. Trollope & Sons for the Grosvenor Club Syndicate, Ltd.).—Consent.

Formation of Streets, &c.

Hammersmith.—The abandonment of the formation of a street to connect Rylett-crescent with Flanchford-road, Hammersmith (Messrs. Milles & Co.).—Agreed.

Chelsea.—That an order be issued to Mr. G. Edwards, refusing to sanction the formation or laying-out of a new street for carriage traffic to lead from Fulham-road to King's-road, Chelsea (for Mr. H. J. Veitch).—Agreed.

Means of Escape at Top of High Buildings.

City.—A deviation from the plans approved on March 3 and April 6 in respect of the means of escape proposed to be provided in pursuance of Section 63 of the Act, on the fourth story of the Wesleyan Centenary Hall, Bishopsgate-street, City, so far as relates to a continuation of the means of escape across the roof of No. 18, Bishopsgate-street to the roof of the Bank of Scotland (Messrs. Gordon & Gunton for the Trustees of the Wesleyan Missionary Society).—Consent.

City.—Means of escape in case of fire proposed to be provided on the fifth story of an addition (on the site of Nos. 62-63, London-wall) to No. 20, Copthall-avenue, City, and also a modification of the plans approved in respect of the means of escape

from the fifth stories of Nos. 20 to 26, Copthall-avenue, and No. 65, London-wall, for the persons dwelling or employed therein (Mr. R. B. Marsh for the City of London Real Property Co., Ltd.).—Consent.

Holborn.—Means of escape in case of fire proposed to be provided on the sixth story of a building upon the site of Nos. 83, 85, and 87, Southampton-row, Holborn (Mr. C. F. Doll).—Consent.

Buildings for the Supply of Electricity.

City.—A five-story office building on the site of Nos. 82, 83, and 84, Fenchurch-street, City, and over part of the basement story of the Charing Cross and Strand Electricity Supply Corporation's electricity distributing station (Mr. W. E. Clifton).—Consent.

St. Pancras, East.—A roof to the King's-road power-house (Mr. S. W. Baynes for the Council of the Borough of St. Pancras).—Consent.

*** *Recommendations marked † are contrary to the views of the Local Authorities.*

The Student's Column.

CONCRETE-STEEL.—II.

THE PROPORTIONS OF CONCRETE.

A CORRECT knowledge of the constituents of the new material is absolutely necessary to the designer of concrete-steel. Interesting as the theory of concrete is, we must resist the temptation to discuss it here, except so far as may be absolutely requisite for making clear the essential points connected with the combined material with which we are now concerned. The proportions stated in Table I. are some of those adopted in various forms of concrete-steel construction. Referring to the nature of the aggregate it may be remarked that gravel is very generally favoured, but the sand should always be separated and added afterwards in the correct proportion. When crushed stone is employed, an adequate proportion of cement and sand is added. Crushed brick is not a material to be recommended, chiefly because the strength of the resulting concrete is low. Coke breeze is unsuitable because of its porosity and insufficient strength. Cinder-concrete, as one of the best non-conductors of heat, possesses recommendations from the point of view of fire protection, but from the Report of the Hamburg Commission, issued in 1895, it appears that cinders tend to cause corrosion of embedded iron. Hence, when cinder concrete is used, the metal should be completely coated with neat cement, a plan which is adopted in the Monier system. Whatever may be the character of the aggregate used, it must be fine in order that the concrete may adhere closely to the metal, and protect it from moisture.

Table I.—Proportions of Concrete for Concrete-Steel.

Class of Work.	Cement.	Sand.	Stone.	Gravel with Sand.	Authority.
Columns.....	1	—	—	4	Mr. A. Johnston.
"	1	—	—	4½	M. Considère.
"	1	—	—	3	" "
Walls	1	—	—	6	Mr. A. Johnston.
Partitions ...	1	—	—	3	" "
Beams.....	1	—	—	4	" "
"	1	2	4	—	Mr. Moisseif.
"	1	3	5	—	" "
"	1	—	—	6	M. Considère.
" Melan ...	1	2½	5	—	Prof. I. O. Baker.
" Ransome	1	3	6	—	Mr. Wason.
Floors.....	1	—	—	4	Mr. A. Johnston.
Columbia	1	2½	5	—	Mr. Freitag.
Exp. Met.	1	—	—	3-5	Newcastle Tests (1899).
"	1	2	4-6	—	Mr. Freitag.
Hennebique	1	—	—	4	Dr. W. Ritter.
Melan	1	2	4	—	Mr. Freitag.
Upper ⅓rd	1	2	—	—	
Ransome	1	3	6	—	Mr. Wason.
Roebling	1	2½	6	—	Mr. Freitag.
Arches	1	2½	5	—	Mr. Buck.
"	1	2	4	—	Mr. Moisseif
"	1	3	5	—	

In proportioning the concrete great care must be taken to fill all voids as far as possible. The use of sufficient cement to fill the voids in the sand is absolutely necessary in concrete-steel work. A mortar, consisting of 1 part of Portland cement to 3 parts of sand, is strong and durable, and may be quite suitable for many purposes, although the cement cannot be expected to fill all voids in the sand. The most accurate method of determining voids in sand is that proposed by Mr. Allen Hazen,* and consists in determining the specific gravity first of the solid particles, and second of the material as a whole, including the voids. The percentage of space occupied by the solid particles is then obtained by dividing the specific gravity of the mass by the specific gravity of the particles, and the voids are represented by the difference between the whole volume and the space occupied by the particles. If the sand is not absolutely free from water, as is generally the case, a portion must be dried after the experiment to determine the amount of water, and a correction can then be applied. It is not advisable to dry a moist material before taking its specific gravity, as the closeness of packing will probably be different for wet and dry material.

It is a very important matter that all voids in the aggregate should be filled. The proportion of voids in broken stone can be satisfactorily determined by placing the material in a receptacle of known capacity, pouring in as much water as possible, and measuring the volume used. When applied to the measurement of voids in gravel mixed with sand, this method invariably gives results that are too low. The material is rarely dry, and it is quite probable that the voids measured by displacement will be under-estimated by fully 5 per cent. owing to the presence of moisture. With fine gravel and sand a serious error often results from the fact that all the air is not displaced by the water poured into the receptacle. These facts, considered in connexion with the variable proportions of sand and pebbles in mixed ballast, clearly point to the desirability of separating the constituent parts of such material, so that definite and predetermined proportions may be ensured. It is then easy to make a mortar satisfying the essential conditions, and, having determined the voids in the aggregate, to fill them by the use of a sufficient quantity of properly-proportioned mortar.

In making concrete for use with steel, it must always be remembered that impermeability is quite as important as mere strength. For ordinary construction, so long as concrete is composed of an aggregate of sufficient hardness, voids are not objectionable within reasonable limits. But where concrete has to protect steel from corrosion by preventing the percolation of water, the greatest care must be taken to render it as solid as possible. Sir Alexander Binnie, whose experience as a water-works engineer is valuable on this point, says that, "When attempting to make solid impermeable concrete, we must of necessity have water in superabundance, until the mass is made almost gelatinous; and then we get a perfect mixture."† It must not be forgotten, however, that, while some of the water used combines with the cement in the process of setting, the remainder will evaporate in the course of time, leaving a corresponding volume of voids. Hence it appears to be impossible to make an absolutely solid and impervious concrete, although the condition may be nearly approached by the adoption of correct proportions and by careful manipulation.

The opinion has been expressed that sand should not be too sharp, in making impervious concrete. Mr. Orange,‡ in a discussion upon waterworks in China and Japan, said that "if the sand was very sharp, when cement was put with it the water ran through and carried it away. It had to be a little thick, loamy, and close, in order to make a close concrete. That was why, when the sand was sharp, he always used a certain portion of the siftings from the stone-breaker, which was almost dust, to make the mixture close." This is quite contrary to practice in concrete-steel construction both in this country and in the United States. In a recent paper on the subject, Mr. A. de H. Galbraith§ pointed out that "coarse sand, very gritty, and of the greatest cleanness must be used in preference to fine, but whatever the composition of the sand, it is absolutely necessary that it shall be entirely free from all traces of any argillaceous, or earthy matter." Again, to quote from an American source, one of the speakers, referring to a concrete-steel water tank, said that it was the practice in Europe not to use sand that was in the slightest degree dirty, and that he expected to make the tank water-tight by giving what is termed the *glassé* finish.*

The results of some experiments by Mr. C. H. Colson† are recorded in Table II. These tests were made to ascertain the impermeability of concrete to be used under a constant head of about 46 ft., and in a position where this quality was of the utmost importance. The blocks tested were 28 in. by 24 in. by 18 in., and the apparatus, which is illustrated in Fig. 1, consisted essentially of a cast-iron

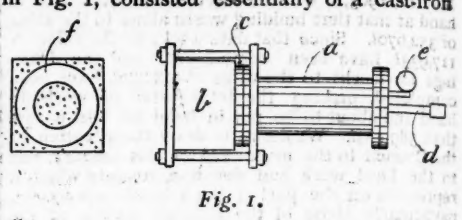


Fig. 1.

cylinder, connected at one end to the block to be tested, and at the other to a hydraulic pump. The blocks were prepared for testing by removing the top skin, and putting on a cement ring of the same diameter as the flanges of the cylinder, the surface inside the ring being kept quite clean. At a pressure of of 26 lb. per square inch there was a slight appearance of dampness in some of the blocks, but in no case, even with the highest pressure, was there much percolation.

Table II.—Permeability Tests of Portland Cement Concrete Blocks under a Pressure of 30 lbs. per Square Inch.

Proportions.			Age of Block.	Duration of Test at Maximum Pressure.	Depth of Percolation from Pressure Side at End of Test.
Cement.	Sand.	Stone.			
Parts.	Parts.	Parts	Days.	Hours.	Ft. in.
2	3	7	47	2	—
2	3	7	58	2	—
1½	3	7	44	1½	0 6
1½	3	7	48	2	0 7
1½	3	7	50	2	0 8
1½	3	7	52	2	—
1	3	7	33	2	0 10
1	3	7	53	2	0 10
1½	2	7	19	2	0 4
1½	2	7	21	2	—
1½	3	6	51	2	0 6
1½	3	6	57	2	—
1	3	6	48	2	1 6
1	3	6	42	2	1 6
1	3	6	50	2	1 0
2	4	8	50	2	0 10
2	4	8	56	2	1 0
2	3½	8	29	2	0 10

Some more recent experiments as to the water-tightness of concrete were conducted last year at the Thayer School of Engineering, in the United States.‡ The concrete consisted of 1 : 2 mortar, ranging from 30 to 45 per cent. of the concrete, and the specimens tested were 5 in. thick. The following results were noted :—

Pressure per sq. in.	Number leaky.	Number not leaky.
80 lbs.	11	7
40 lbs.	5	7
20 lbs.	4	0

It was found further that the poorest results were given by one brand of cement, furnished by the makers as being specially adapted for making watertight concrete.

Referring to this aspect of concrete, Mr. J. W. Sandeman,§ of Newcastle-on-Tyne, says, "Judging from experience, the volume of mortar to insure water-tightness should not be less than 50 per cent. of aggregates having 35 per cent. of interstices; adding, therefore, one-third of the volume of the mortar to give the volume of cement and sand, these would equal 66⅔ per cent. of the volume of the aggregates which should allow for all contingencies, and insure the stones or gravel being surrounded with mortar. Finally, to make certain that the mortar shall be water-tight, the ratio of sand must be limited to about 2 parts of sand to 1 of cement."

These quotations serve to emphasise the necessity for filling all voids both in the sand and in the aggregate.

* Proc. Am. Soc. C.E., vol. xxv., p. 488.
† Proc. Inst. C.E., vol. cvii., p. 125.
‡ Proc. Inst. C.E., vol. c., p. 306.
§ Trans. Soc. Eng., 1902, p. 179.

* Proc. Eng. Soc. Western Pa., vol. xix, p. 145.
† Proc. Inst. C.E., vol. cvii., p. 178.
‡ Proc. Eng. Soc. Western Pa., vol. xix., p. 137.
§ Proc. Inst. C.E., vol. cxxi., pp. 219-220.

In cases where hydraulic pressure exists, as in water-tanks and conduits, the proportions should not be less than 1 part of cement to 4 parts of ballast; or 1 part of cement, 1½ parts of sand, and 2½ parts of crushed stone. In building construction, where percolation is not aided by hydraulic pressure, the concrete may be of poorer quality, but for outside work it would be wise to adopt the proportions of 1 to 4. The infiltration of water may be arrested by a rendering of 1 to 1 cement mortar and a facing of neat cement, while the steel may be further protected by being embedded in similar mortar. With such precautions it may be allowable to adopt weaker concrete than would otherwise be necessary, especially for inside work. However, as absolute confidence in the preservation of the steel is an essential feature in concrete-steel construction, it will always be judicious to spend a little more money in cement than to run the slightest risk of corrosion. The most approved practice in dock and harbour works is to avoid reliance upon a mere facing, and to endeavour to make the entire mass impermeable. This example is certainly worthy of imitation in building construction.

BOOKS RECEIVED.

PRACTICAL SCIENCE FOR PLUMBERS, ENGINEERS, &c. By J. Wright Clarke. (B. T. Batsford. 5s.)

REGULATIONS FOR SECONDARY SCHOOLS. (Eyre & Spottiswoode. 2d.).

GENERAL BUILDING NEWS.

WHITEFIELD TABERNACLE.—The Special Missions Committee of the London Congregational Union have decided to complete this building in the Tottenham Court-road, at an estimated cost of about 10,000*l.*, and in a limited competition the drawings of Messrs. Barnes-Williams, Ford, & Griffin, of London, have been placed first, and the architects have been instructed to prepare the working drawings.

THE PARISH CHURCH, OVERSTONE.—The Parish Church of Overstone, near Northampton, has just been reopened, after having been closed about twelve months for the purpose of additions and restoration. The church, which is dedicated to St. Nicholas, was built in the year 1803 without any regard to architectural treatment either externally or internally, and consisted of a tower, nave (with gallery at the west end), a small chancel, and vestry. The present alterations and additions, carried out in Weldon stone, consist of a south aisle, organ chamber, vestry, and porch. The tower (which was much dilapidated) has been re-roofed and new battlements and windows provided; the bells have been rehung and an additional bell added; the lower portion of the tower now forms a baptistry. A new chancel arch has been substituted for the old plaster arch, the new arch being brought a distance of 3 ft. into the nave in order to enlarge the chancel and to give the required accommodation for the choir. A new ceiling to the chancel, divided into panels with moulded oak ribs and carved bosses, has been substituted for the original plaster ceiling and cornice. The reredos, altar rail, prayer desk, and choir stalls are of wainscot oak; selected pitchpine has been used for the seating of nave and aisle. An oak pulpit on a Portland stone base has been erected by the clergy and personal friends as a memorial to the late Canon Birch, who for a period of forty-three years was Rector of Overstone. The lectern was presented by Mr. and Mrs. Gartside in memory of the late rector, the font, of Devonshire marble and polished Hopton Wood stone, was also presented as a memorial to the late rector by the parishioners, past and present, of Overstone. A new organ has been placed in the organ-chamber by the tenants of the Overstone Estates as a memorial to the late Lord Wantage. The glazing throughout, with the exception of a portion of the east window of chancel, is entirely new, and has been carried out by Messrs. J. Powell & Sons, London. The chancel, baptistry, aisle, and porch are paved with terrazzo marble mosaic, wood block paving being used in the organ chamber, vestry, &c. The heating apparatus was supplied by Mr. J. Grundy, of Tyldesley, Manchester. Messrs. J. Pullen & Sons, masons, Northampton, supplied the stonework. The carving was done by Mr. Reynolds, of Northampton. The works generally have been carried out by the estate workmen from the plans and under the superintendence of Mr. J. Mander, architect, Overstone Park.

CHAPEL, MAESTEG.—A new Wesleyan Chapel has just been opened at Maesteg. The building is built with local stone, faced with blue Pennant stone and Bath stone dressings. Accommodation is provided for 300 persons, with provision in future galleries for a further 150. A schoolroom is attached for 190, with two classrooms, minister's study, &c. The design is by Mr. W. Beddoe Rees, architect, Cardiff, and the builder is Mr. Stephen Lewis, Maesteg. The total cost is 1,500*l.*

UNITED METHODIST FREE CHURCH, JARROW.—The United Methodist Free Church, Grainger-road, Jarrow, has just been reopened after renovation and redecoration. The alterations and additions consist of the removal of a portion of the front wall of the church and the building of a projecting vestibule and cloakroom. The entrances have been remodelled and the interior redecorated. Externally the new work is executed in red brick work, with stone freely introduced. The work has been carried out under the superintendence of Mr. G. R. Smith, architect, of South Shields.

BAPTIST CHAPEL, DERBY.—The new Baptist chapel situated on the Pear Tree-road, opposite St. Thomas's Church, Derby, was opened recently. Mr. Councillor J. Young, of Derby, was the builder, and Mr. A. H. Goodall, of Nottingham, the architect. In all, some 650 worshippers can be accommodated. The total outlay has been nearly 4,500*l.*

ST. STEPHEN'S CHURCH, SOUNDWELL, GLOUCESTERHIRE.—A new church is being erected at Soundwell from plans prepared by Mr. H. M. Bennett, of Bristol. The building will be a Gothic structure, consisting of nave, north aisle, south aisle, baptistry, chancel, organ-chamber, clergy vestry, and choir vestry, with an auxiliary apartment over the choir vestry, and lavatory and heating-chamber at the north end of the church. The entrances will be through porches at the west and north-west, and there will be aisle entrances on the north and south sides. The chancel will be divided from the nave by a dwarf wall, surmounted by iron railings. The chancel, which will be approached by two steps of marble, is to be paved with glazed tiles in patterns. The sanctuary will be two steps higher than the chancel, and on the south side there will be sedilia for the clergy, arcading between. The nave and the aisles will consist of five arches, or bays. The structure will be of Pennant stone, with freestone quoins and dressings. The inside is to be lined with freestone ashlar work; the roof is to be open, showing the timber principals and rafters. Oak blocks laid to pattern on concrete are to form the floor, with granolithic pavement for the walking ways and in the porches. The church will be lighted by a tracery window and two single windows at the west end, aisle clearstory windows north and south, five single windows at the east end, and two small windows on the north and south side of the chancel. Artificial lighting will be by incandescent gas burners, attached to pendants in the nave, brackets in the aisles, and to standards in the choir. Heating will be by low-pressure hot-water pipes carried through the building, and ventilation will be by exhaust ventilators over the roof and inlets over the heating coils. Seating for 900 persons will be by means of chairs. The roof is to be covered with Broseley tiles. Over the north-west gable will be an open belfry for one bell, and a feature of the elevation will be an ornamental ventilating spire, rising from the roof two-thirds of the distance from the belfry. As funds will probably not be forthcoming to carry the building to a completion, the intention is to erect the nave and north aisle and the porch at the west end. These sections will give accommodation for 450 worshippers.

CHURCH SCHOOLS, FARNWORTH-WITH-KERSLEY, LANCASHIRE.—The foundation-stone of the new Church Schools, Farnworth, was laid recently. The general contractors are Messrs. Cooke Bros., Mr. R. Knill Freeman, Bolton, being the architect.

SCHOOLS, ERDINGTON, BIRMINGHAM. — On the 30th ult. foundation-stones were laid of new schools both at Fentham-road and Slade-road, Erdington. The Slade-road buildings will cost over 9,000*l.*, and will consist of two blocks, one intended as an infants' department, and the other as a girls' department. Accommodation will be provided for about 650 children. There will be provision for cookery classes, but the present building only forms part of a scheme which includes the erection of a block for manual instruction. The architect is Mr. Jenkins, of Bennett's Hill. The Fentham-road school will form part of a larger scheme which will be completed when the demands of the district require it. At present an infants' block only will be constructed, affording accommodation for 400 children in seven classrooms. When completed the building will be used as a higher-grade school for 300 boys and 300 girls, and will include a joiner's shop, laundry, cookery demonstration room, chemical and physical laboratories, lecture-rooms and gymnasium. The school will be erected from the designs of Messrs. Cossins, Peacock, & Bewlay. The contract for the present building amounts to 5,997*l.*

L.C.C. EPILEPTIC COLONY, EWELL.—On the 1st inst. Princess Louise, Duchess of Fife, attended the opening of the Epileptic Colony at Ewell. The colony spreads over about twenty acres of ground, and the villas are surrounded by about a hundred acres of land, which is to be used for farming purposes, the idea being that the inmates shall be employed in cultivating the land. The colony is the property of the London County Council, and the buildings were designed by Mr. W. C. C. Smith. There are eight villas in all, with a centre hospital building.

INFIRMARY EXTENSION, BOLTON.—The corner stones have just been laid of the new "Jubilee and Coronation" wing of Bolton Infirmary. The extension has been designed by Messrs. Cunliffe & Pilling, of Bolton. The dimensions of the new block are about 120 ft. long and 46 ft. wide. The main entrance will lead past a certificate office into the waiting hall, estimated to seat about 120 out-patients. Along the side of this hall are arranged the doctor's consulting and examination-rooms, and the dark and other rooms required by the ophthalmic surgeons. From these rooms the patients enter an inner waiting hall adjoining the dispensary, and are then discharged from a separate exit door. The dispensary, drug stores, and disinfecting-rooms are arranged for on the west side of the building. The new accident-room is situated near the front entrance, whilst a small consulting-room and room for minor operations adjoins the main room. The contractors for the undertaking are Messrs. A. Atherton & Co., Mr. John Dickinson, Messrs. J. Bradbury & Son, and Messrs. J. W. Witter, the latter firm having in hand the plumbing and heating.

NEW WING, DARLINGTON TRAINING COLLEGE.—The new wing of the Darlington Training College is the third enlargement since the college was built thirty years ago. It is practically a separate pavilion, being connected with the main building only by a glazed corridor. It is 84 ft. long and 28 ft. wide (with several protecting bays), and comprises five stories. The basement contains cloakroom, cycle stable, lavatories, and heating chamber. The ground floor has a lecture theatre 35 ft. by 25 ft. (seated in amphitheatre form, and having separate entrance for pupils from the practising school), common-rooms, 30 ft. by 25 ft., and 16 ft. by 14 ft. On the first floor are the governess's sitting-room and bedroom, twelve cubicle bedrooms for students, two bathrooms, lavatory, &c.; and on the second floor governess's sitting-room and two bedrooms, and twelve cubicles, bathrooms and lavatory, &c. On the top floor are four cubicles, servants' dormitory, bathroom, linen-room, boxroom, lavatory, &c. The building is faced with red pressed bricks, having stone dressings. The roof is covered with dark Westmoreland slates. The joiners' work is of pitchpine varnished, except the floors of common-rooms and the stairs, which are of oak. The corridor which connects the new wing with the main building is 8 ft. wide, floored with mosaic tiles, and covered with glass. The work has been designed and carried out under the direction of Messrs. J. P. Pritchett & Son, architects, of Darlington, by the following contractors:—Brickwork, masonry, and plastering, Messrs. Mackenzie; slater's work, Mr. Lancaster; joiner's work, Mr. H. Richardson, of Barton; plumber's and glazier's work, Mr. Coates; painter's work, Messrs. Hoskins; heating, Messrs. Dinning & Cooke, Newcastle-on-Tyne; electric lighting, Messrs. Ernest Scott & Mountain, Newcastle-on-Tyne.

WHITE OAK OPHTHALMIC SCHOOL, SWANLEY.—As a result of the consideration of the subject by the Departmental Committee on Poor Law Schools in 1896, the duty of making provision for children suffering from ophthalmia was placed upon the Metropolitan Asylums Board by order of the Local Government Board in 1897. The site of forty-nine acres at Swanley was purchased in December, 1897, at a cost of 5,050*l.* The buildings had to be planned to serve both as a school and a hospital, while not being too expensive in either capacity. The architects are Messrs. Newman & Newman, of London, and the builder Mr. Charles Wall, of Chelsea, whose tender was accepted in February, 1901, at the sum of 112,324*l.* The school was formally opened on May 23 of the present year. At the entrance is the gate porter's lodge and the receiving block, with ophthalmoscopic room and laboratory. There are thirty cottages for children, arranged in fifteen pairs, and in five groups of three pairs. Each cottage accommodates twelve children and a house-mother. In connexion with each of the five groups is a small staff block, containing a room for the medical treatment of the seventy-two children in the group, and quarters for the charge nurse who carries out this treatment, a cook-general, and a general servant. The heavier part of the cooking for the group is done in this block. The central administration block contains quarters for the matron, assistant matron, domestic and laundry staff, extra nurses, storekeeper's office, general stores, and needle-room. The other buildings include the junior school, the senior school (with special room for ophthalmic surgeon), the laundry, four cottages for male staff, infirmary, and isolation cottage.

ASYLUM, CARDIFF.—The Cardiff Asylums Committee received tenders recently for the superstructure of the new asylum to be erected at Whitchurch. Ten tenders were received as follows:—Jas. Allan, Cardiff, 238,516*l.* 18s. 11d.; D. W. Davies, Cardiff, 237,750*l.*; Turner & Sons, Cardiff, 244,222*l.*; Watkin Williams, Cardiff, 233,990*l.*; Wm. King & Sons, Westminster, 232,390*l.*; M'Cormick & Sons, London, 242,787*l.*; Wm. Thomas & Co., Cardiff, 275,297*l.* 19s. 5d.; H. Willcock & Co., Wolverhampton, 233,028*l.*; Lloyd Bros., Swansea, 263,376*l.*; Stephens, Bastow, & Co., Bristol, 264,997*l.* 0s. 3d. Alderman David Jones moved that the Council be recommended to accept Messrs. King & Sons' tender of 232,390*l.*, subject to the sureties being satisfactory. Mr. S. O. Williams seconded, and it was carried unanimously.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENT.—In consequence of the death of Mr. A. C. Breden, who was partner in the firm of Ernest Runtz & Co., architects, the firm will in future carry on practice under the style of "Ernest Runtz & Ford," Mr. G. M. Ford being now Mr. Runtz's sole partner. The firm have opened a branch office at Lewes.

GLASGOW EAST-END INDUSTRIAL EXHIBITION.—Mr. John Fairweather, Glasgow, has been appointed architect to the Glasgow East-end Industrial Exhibition, which opens next December. Four competitive designs were submitted to the Exhibition Council, and from these the Council selected those of Mr. Fairweather, as being the most practical and suitable for the exhibition. Much originality and resource is said to be shown in the adaptation of the present buildings and grounds, and in the treatment of the entrance façade and concert hall. The latter is designed to accommodate 3,500 persons, and the platform, in addition to the usual accessories, will have a fine organ. The exhibition will be of a general character, divided into three sections, and is being promoted for the benefit of the reconstruction scheme of the Royal Infirmary.

NIDD VALLEY ARBITRATIONS: WINN AND THE BRADFORD CITY CORPORATION. — Lieutenant-Colonel W. H. Wellsted, C.E., the umpire in the above matter, has just issued his award, amounting to 14 585*l.* The claim was in respect of 1,415 acres of leasehold land in the Nidd Valley, taken for the construction of the reservoirs and gathering ground for the Bradford Corporation Waterworks, and amounted to 28,220*l.*, whilst the value placed upon it by the Corporation witnesses was 7,973*l.* The arbitrator for the claimant was Mr. Thos. Fenwick, C.E., Leeds, and the witnesses were Messrs. C. R. Fenwick, W. B. Boord, John Maugham, Richard Horsfall, W. F. Tempest, and John Farrah. The arbitrator for the Bradford Corporation was Mr. Chas. Gott, C.E., Bradford, and the witnesses were Messrs. Fredk. Fowler, W. B. Woodhead, R. B. Broster, and Geo. Runton.

THE WIDENING OF PICCADILLY.—At the meeting of the Westminster City Council on the 2nd inst., Captain Jessel, M.P., the Mayor, presiding, the Improvements Committee reported that they had considered a letter from the London County Council stating that they were endeavouring to give effect to their undertaking to take the necessary steps to obtain possession of the premises at present occupied by lessees, but that it was found that it would considerably assist the negotiations with the tenants if the City Council would grant its aid by putting into force, at the cost of the County Council, its statutory powers under Michael Angelo Taylor's Act; also stating that the request was made because the County Council possessed no such compulsory powers for the acquisition of property as those conferred on the City Council by the Act in question. The County Council suggested that, in the event of the City Council's complying with their request, the general practice in such cases should be adopted—viz., that the City Council should appoint the County Council's solicitor and valuer respectively to act in the matter in conjunction with the Town Clerk. The Committee recommended that the request of the Council should be complied with, and the Council agreed.

NEW BUILDING BY-LAWS, ROCHDALE.—On the 2nd inst. at Rochdale Town Council Alderman Topper, the Chairman of the Building Committee, in submitting a draft of the new building regulations, informed the Council that these by-laws, which had been submitted before to them, had been toned down, and if they were now passed he only anticipated an objection to one clause, which enforced the site of a house being concreted. After a short discussion, Alderman Topper said that the Committee had no desire to stagnate the building trade, but to make new houses as healthy as possible, and prevent "jerry buildings" being erected. The Council then approved the new building regulations.

ROYAL COMMISSION ON LONDON LOCOMOTION.—At a sitting of this Commission on Friday last week under the chairmanship of Sir D. Barbour, Mr. H. E. Harper, Statistical Officer of the London County Council, continued his evidence, and was examined by different members of the Commission as to the best means of dealing with the housing problem. Witness expressed the opinion that the only effective means of inducing workmen to live out of London was by the provision of cheap railway fares, but if the remedy was to be effective, it must be brought about by all the railway companies running lines into the country. By this means there would be equal attractions offered all round, and the congestion in the central area would be diminished. As an illustration of the way in which people took advantage of cheap means of transit, he witnessed the opening up of Acton by means of the electric tramways and tube railway in 1900. In three years the rateable value of Acton increased 14 per cent. Where, however, a single district was opened by a tube railway unmixed good did not follow, because people flocked to the district opened up, and very quickly the carrying capacity of the trains was increased, while in the district itself rents quickly rose and overcrowding ensued. So if a single tube railway went to the eastern district, he was afraid it would only tend to aggravate the present excess of population. Hence his desire to see all railways doing their part in carrying the people out. He admitted that it could hardly be expected that a railway company should run unremunerative trains to create a traffic, and there might be a case for consideration as to the localities affected giving some *quid pro quo*.

JOINT COMMITTEE ON MUNICIPAL TRADING.—On Thursday last week evidence was given by Mr. H. A Haward, the Controller of the County Council, with reference to the system adopted by the Council for raising money. In reply to Lord Rothschild, witness described the policy of the London County Council with reference to the fixing of value of land used for housing purposes. He pointed out that where the Council cleared insanitary areas or initiated improvement schemes they were under statutory obligation to rehouse the people displaced. It was obviously impracticable to charge to the housing scheme the full cost of the land used for housing purposes, and the course adopted was for the valuer to fix the value of the land for housing purposes, and this was charged against the housing scheme. The excess was charged against the cost of clearing the insanitary area or against the cost of the improvement. He submitted that this was a perfectly legitimate policy to pursue, and pointed to the Holborn and Strand Improvement scheme as an illustration. Here the Council were under statutory obligation to rehouse before they could pull down the buildings in the area, and, consequently, they purchased what was known as the Reid's Brewery site. This site was written down very considerably for housing purposes, and the balance was charged to the Holborn and Strand Improvement scheme.—At a further sitting of the Joint Committee on Municipal Trading on Monday, Mr. Haward, the Controller to the London County Council, continued his evidence, and was asked by Sir G. T. Bartley if the facilities offered by the Council for the obtaining of small loans by Borough Councils for such things as houses, which were to do away with the contractor, did not lead to extravagance. Witness replied that if the contractor were setting up in business he would reckon the purchase of his plant was a fair capital charge. Answering questions as to whether it was not a somewhat dangerous financial operation to purchase the Reid's Brewery site for 200,000*l.*, and then write its value down for housing purposes to 44,000*l.*, witness said the position was this. By purchasing the brewery site for providing accommodation for persons displaced by the Holborn and Strand Improvement the Council was able to set free for commercial purposes a corresponding portion of land which occupied a frontage to the new street, and this was very valuable land, for which they hoped to get a good price. In other words, it paid the Council better to house the working classes a little bit away from the actual site of the improvement in very many cases, for it gave them more valuable land, which the Secretary of State would otherwise compel them to appropriate for housing displaced persons. To a large extent the purchase of Reid's Brewery site was a commercial undertaking, although, of course, the primary duty of the Council was to rehouse the persons displaced.

FLOODING OF BASEMENTS OF HOUSES.—In reference to the complaints of the flooding of the basements of houses in the borough of Kensington, the Medical Officer of Health, in his last monthly Report, says: "I regret to have to report the receipt of complaints with respect to the flooding of the basements of houses in various localities consequent on the recent heavy rains—especially on the 13th ult. I understand that the building for the pumping machinery at Lot's-road, Chelsea, was completed some time since, but when the engines will be fixed and ready for use I cannot say—ere long I hope. Meantime the only satisfaction that can be offered to sufferers from the inundations is that a period will be put to them when the pumping stations shall have been completed and brought into operation."

BRITISH FIRE PREVENTION COMMITTEE.—Mr. F. R. Farrow has resigned the position of Chairman of the Commercial Section and the membership of the Executive of the British Fire Prevention Committee, and also the title of Hon Publications Secretary of the International Fire Prevention Congress.

SEA WALL, ABERYSTWITH.—Mr. Councillor E. H. James, Mayor of Aberystwith, on Saturday last laid the last stone in the new sea wall and promenade erected by the Corporation. The work, which will cost the town over 16,000*l.*, has taken over two years to complete, and has been built from the designs of Mr. Rees Jones, Borough Surveyor. The stone was obtained from the town's own quarry.

EXHIBITION OF BRITISH ENGRAVING AND ETCHING.—As the collection of examples of British engraving and etching brought together in the Galleries of the India Section of the Victoria and Albert Museum continues to attract many visitors, the Board of Education have arranged that it shall remain open until September 30 next.

WAR MEMORIAL AT GUY'S HOSPITAL.—A drinking fountain, erected as a memorial to those members of the hospital who were killed or died in South Africa, was recently unveiled at Guy's Hospital. It has been executed in coloured and polished marbles from the designs of Mr. Frederick Wheeler, of Staple Inn. The bronze inscription, panels, and mountings of the fountain were supplied by the Coalbrookdale Co., Queen Victoria-street; whilst the remainder of the work was executed by Messrs. John Daymond & Son, Vauxhall Bridge-road.

LEGAL.

ACTION BY A BUILDER.

THE case of Green *v.* Radford and others came before Mr. Justice Buckley in the Chancery Division on the 3rd inst.—an action by the plaintiff for a declaration that the second defendants, the Hucknall Torkard Industrial, &c., Society, Limited, were not entitled to permit to be used any part of the Connery Estate, near Nottingham, except subject to the conditions and stipulations contained in an agreement dated November 6, 1900, and that the defendant Radford held the lands purchased by him subject to such conditions and stipulations. The plaintiff also claimed an injunction restraining Radford from using or permitting to be used any buildings on land forming part of the Connery Estate for any trade or business except as an office or private agency, and the Society for permitting any of the land to be so used.

Mr. Astbury, K.C., and Mr. Petersen appeared for the plaintiff; Mr. Buckmaster, K.C., and Mr. W. H. Stephenson for the defendant Radford; and Mr. Laine for the Society.

Mr. Astbury, in opening, said this was a "building plot" case. Both the plaintiff and the defendant Radford were members of the defendant Society which in April, 1900, purchased from the Duke of Portland a piece of land in the parish of Hucknall Torkard, lying to the north of a road called "The Connery." In accordance with a scheme the land was laid out as a building estate, with a street running through the middle, called Co-operative-avenue. The plan of the estate was exhibited in the window of the Society, together with an announcement that the land was for sale and that conditions and terms could be obtained from the secretary. The Society had printed a common form of agreement, which provided that the conveyance should contain proper covenants, restrictions, and provisions for carrying out the conditions referred to in the agreement relating to the width of Co-operative-avenue. One of the terms of the agreement was that no buildings other than those for private residences should, without the consent of the Society, be erected upon the land, and that no building on the estate should be used for any business or trade whatever, those conditions not to prevent the use of a dwelling-house as an office or private agency by licence from the Society, provided that it in no way interfered with the residential character of the street. The plaintiff, who was a builder, on November 6, 1900, entered into an agreement to purchase 2485 sq. yards fronting on to Co-operative-avenue for 622*l.* 14*s.*, the agreement being on one of the printed forms, and containing all the restrictions and stipulations. The land was conveyed to the plaintiff on May 15, 1901, and the conveyance also contained the restrictive covenants, but there were no covenants whatever by the defendant Society. On August 27, 1901, the defendant Radford, a Shetland shawl manufacturer, agreed to purchase from the Society part of the Connery Estate adjoining the plaintiff's land on the north side, and the agreement was on a similar printed form to the plaintiff's, but the clause as to the nature of the buildings to be erected on the site was altered by giving Radford leave to erect a workshop. On December 7, 1901, Radford purchased another plot, and the conditions of that sale allowed the land to be used for the erection of a "getting-up" room and a store or dry-room. The defendant Radford had erected upon his land a workshop for the manufacture of Shetland shawls, and had threatened and intended to erect the "getting-up" and drying-room. The result was that the value of the plaintiff's land was materially diminished, as the business of a Shetland shawl manufacturer, as carried on by Radford, was a noisy one, which caused much discomfort and annoyance to the neighbours. His contention was that the whole of this estate was subject to a building scheme which the Society could not go behind, and they were bound by the covenants the purchasers were subject to.

Evidence having been called on both sides,

Mr. Buckmaster summed up the defendants' case. He argued that there was nothing in the plans that could suggest a building scheme. They showed, no doubt, how the Society were proposing to deal with the land; but there was nothing to bind them to so deal with it. The plaintiff was told before he signed his contract that in two instances, at least, the restrictions had been relaxed.

His lordship in giving judgment said that, in his opinion, the plaintiff was entitled to judgment. What the Society intended to do there could be no doubt about. The only question was what was communicated to their buyers. Radford had bought with notice of the scheme. The plaintiff bought his land on the condition that the Society could not grant any licence such as was granted to Radford, and Radford having bought with notice of the scheme, was not entitled to the benefit of the licence. He accordingly granted an injunction restraining the

use of any building on Radford's land for the purpose of any trade or business, or for any purpose other than that of a private dwelling-house. The plaintiff did not ask for damages, and would have the costs of the action.

Upon the application of Radford's counsel the operation of the injunction was suspended for a month.

BY-LAW DISPUTE AT MALVERN.

THE case of Pomeroy and Another *v.* The Malvern Urban District Council came before a Divisional Court of King's Bench, composed of the Lord Chief Justice and Justices Wills and Channell, on the 6th inst., on the appeal of the Hon. E. A G. Pomeroy and the Hon. Hilda E. Pomeroy, his sister, against a decision of the Justices of Great Malvern convicting the appellants of having, as it was alleged, unlawfully allowed a new building, viz., a billiard-room, to continue to exist in such a state as to be a contravention of By-law No. 11 of the by-laws of the district. The charge against the appellants was that the said building was not enclosed with walls of good brick, stone, or other hard and incombustible materials, and with good mortar and cement.

The case came before the Court in the form of a special case, from which it appeared that the Justices, after hearing the evidence of a Mr. Maybury, the Surveyor of the Council, found as facts that the building was not made of incombustible materials as required by the by-laws, but was a wooden-framed billiard-room covered with galvanised iron outside and lined with matchboarding inside. They found that the male appellant gave evidence at the Great Malvern Petty Sessions on November 5, 1902, when he was convicted of the original offence of erecting the building in question in contravention of the by-laws. The Justices further found that the appellants' house, "The Chace," and the billiard-room attached to it were about four miles from the town of Malvern and within the Malvern Urban District, and that there were no other houses in close proximity to it. The respondent Surveyor contended that it was not necessary for him to give evidence with regard to these objections, as the objections were concluded by the previous conviction on November 5, 1902. The appellants' contention was that the previous conviction was by consent and upon the understanding that no subsequent or further proceedings should be taken. The Justices, however, convicted the male appellant and fined him 10*l.*, being 1*l.* a day for ten days, and costs 15*l.* 15*s.* The Justices also convicted the lady appellant, who did not appear, and fined her 10*s.*, being 1*s.* a day for ten days, and 9*s.* costs. The question of law raised for the opinion of the High Court was, first, whether there was sufficient evidence to convict both or either of the appellants, and, second, whether the by-law in question was or was not *ultra vires* and unreasonable.

At the conclusion of the arguments of counsel,

The Lord Chief Justice, in giving judgment, said it seemed to him there was really not sufficient evidence as to the person who had continued to maintain the building, which had been erected in contravention of the by-law. There was certainly no evidence as to the sister or as to which of the two persons continued the offence. He thought, following the principle laid down by the late Lord Russell of Killowen in the case of Badly *v.* The Cuckfield Rural District Committee, it might in certain cases be very hard to apply a by-law such as this in all its strictness to a building which was a considerable distance from other buildings, and which consequently would not be a source of danger to neighbouring houses in case of fire. The magistrates had, under Section 16 of the Summary Jurisdiction Act, 1879, discretionary powers to deal with an offence if it were found to be of a trifling nature. His Lordship was of opinion that the conviction in each case should be quashed, and the case sent back to the Justices for them to find who was the proper person to be convicted, if at all. He thought also that the magistrates should be informed that they had a discretion under Section 16 of the Summary Jurisdiction Act, 1879. In his Lordship's opinion, the previous conviction of the male appellant on November 5, 1902, was no proof of his committing a continuing offence.

Justices Wills and Channell concurred.

Mr. Amphlett, K.C., and Mr. Coventry appeared for the appellants; and Mr. A. Glen, K.C., and Mr. Lushington for the respondents.

NORWOOD NUISANCE CASE SETTLED.

IN the Chancery Division on the 7th inst. Mr. Justice Farwell concluded the hearing of the case of Morris *v.* The Hentschel Colourtype (1901) Co., Ltd., an action by the plaintiff, Mr. Christopher Morris, for an injunction to restrain the defendants from causing a nuisance by the noise of machinery and smells arising at the defendants' factory at Lower Norwood.

Mr. Jenkins, K.C., and Mr. Rolt appeared for the plaintiff; and Mr. Upjohn, K.C., and Mr. F. Whinney for the defendants.

Mr. Jenkins, in opening the case, said that the plaintiff was the trustee of a house and land known as Portobello House, Knight's Hill-road, Norwood, a small estate comprising about seventeen acres of land. The neighbourhood was purely residential, and the property was bought for a Miss Morris in 1876 (the plaintiff being her trustee), the freehold costing 12,000*l.*, and a good deal of money having been spent on it since. The defendants company's factory was built in 1901, and adjoined the plaintiff's property. The nuisance complained of was caused by the working of the defendants' engines in the factory, and defendants also caused to issue from their premises offensive and unwholesome fumes, smells, and vapours, which spread over the plaintiff's house and land. The noise from the defendants' engines sometimes commenced as early as five o'clock in the morning, and often continued till ten o'clock at night. The plaintiff alleged that both the smells and the noise constituted a nuisance, and claimed an injunction to restrain their continuance.

Evidence having been called in support of the plaintiff's case, the case was eventually settled, Mr. Upjohn stating, after he and Mr. Jenkins had seen the learned Judge in his private room, that fair and reasonable terms had been agreed on between the parties, which need not be mentioned in court.

Mr. Jenkins said he considered the terms fair and reasonable, and the case, with his Lordship's sanction, was settled upon the terms agreed to.

PATENTS OF THE WEEK:

APPLICATIONS PUBLISHED.*

17,101 of 1902.—H. BIDDLE: *Chimney pots.*

A chimney-pot formed with a base of such a size that it will fit into the brickwork of the top of the chimney for which it is intended, and provided with external flange or projections to rest upon the top of the brickwork to prevent it slipping down too far.

24,922 of 1902.—A. SCHLEIDT: *Syphon Flushing Cisterns.*

Flushing cisterns for water-closets, &c., in which the water is discharged on raising two piston valves, and the air required for such discharge is introduced through a tube, in which, moreover, the pressure and the extent to which the cistern is to be filled are regulated by the counterpoise and the regulating valve.

2,934 of 1903.—C. E. LONG and J. C IRVINE: *Fasteners for Windows and the Like.*

In fasteners for windows or the like, having a pivotted arm carried by the first frame or member, and adapted to receive angular motion to interlock or grip a segment or equivalent device carried by the second frame or member; forming or fitting pivotted arm with a key-operated lock so located therein as to be brought into proper relation with a lock bolt-hole formed in the engagement device or its fittings on the second member when the arm is connecting the two members, whereby by operating the key-operated lock the pivotted arm is secured against unwarranted operation from either the exterior or the interior of the windows, or the like.

6,798 of 1903.—E. G. WATROUS: *Water closets.*

In a water-closet the combination of a discharge valve controlling the discharge from the closet bowl, and a slow closing inlet valve controlling the closing movement of the discharge valve.

10,060 of 1903.—E. BOMMER: *Spring Hinge.*

A spring hinge, consisting of a flange attached to the door-frame and provided with a retaining seat at one end, a flange applied to the door and provided with a perforated bracket at the end opposite the seat; said flanges being provided with pintle sockets and a tension spring, the middle coiled portion of which is retained by the seat, while the upper end engages the perforated bracket and the lower end, the pintle sockets forming the pintle for the same.

12,920 of 1902.—J. G. FORBES: *Hollow Interlocking Building Blocks and the Method of Producing Same.*

This invention relates to improvements in hollow interlocking blocks and in the production of same. In the carrying out of this invention a block of concrete or other suitable material is constructed or moulded in the form of a frame, with the two sides square and jointed together with a male and female joint at its ends, and a lap, dovetail or other suitable joint at the top and bottom; the hollow portion or inside of the block being filled with inferior concrete or any other holding body; thus forming a solid cone within the said block. At the joint of the superimposed blocks where the inferior concrete is filled in, the blocks may be angular on their edges for the inferior concrete to run in; the cone as it were having projecting angular strips if the blocks were removed. For the purpose of producing the blocks with the square sides, a die-box is employed, which may be formed to suit the blocks to be moulded and with a sole plate having a metal or other block on its top according to the size of the hollow required in the concrete block itself. When the concrete block is moulded the block on the sole plate is forced upward or downwards, the outer box die taking the opposite motion, leaving the concrete block on the sole plate frame, the die box and block being removed. The die box and sole plate may either be made in wood, iron, or steel, and they may be duplicated so as to mould one or more concrete blocks at one operation. To effect the operation of the die box and sole plate block, an arrangement of levers may be employed to be worked automatically, or may be operated the same by hand.

13,231 of 1902.—W. EADE, J. WOOLVEN, and W. J. WOOLVEN: *Water-fittings for Flushing and Supply Cisterns, Water-taps, and Service Mains.*

Applying and utilising a new method of breaking or checking the force of water in its passage through the pipes, by attaching to the pipes and inserting between the supply main and the supply tank and the various points of delivery a vessel containing the air compartment or compartments or chambers, also a compartment or compartments containing coarse sand, grit, or other suitable material, with a vertical metal partition that divides the aforesaid compartments or chambers, the whole forming a medium to intercept and break up pressure and ensure quiet delivery of water.

16,005 of 1902.—J. A. BRODIE: *Road Paving.*

This relates to road paving, and consists in forming the pavement of composite slabs in which a wearing surface of stone is formed by stones embedded in jointing and base material consolidated under pressure in a mould. It also comprises a method of forming paving slabs which consists in assembling the stones which form the wearing surface, face down, in a mould of suitable configuration to give the desired shape of slab, then adding the jointing and base material and consolidating the slab under pressure. The invention also relates to a paving slab which consists of stones so disposed as to give a plane wearing surface, a layer of jointing material to bind the stones together, and a base of a lower grade material of sound deadening character, the whole being consolidated in a mould under pressure.

16,215 of 1902.—H. A. D. COLLINS: *The Manufacture of a Refractory Material.*

The manufacture of refractory material by mixing pulverised silica or silicious matter with one or more compounds of calcium and sodium, moulding the mixture, and subjecting it to a suitable temperature.

16,519 of 1902.—T. BRINDLE: *Bricks for Building.*

The method of manufacturing a compound brick which consists in cementing or similarly securing a slab or slabs of natural rock to one or more of the ends or the sides or the brick.

17,166 of 1902.—W. H. ALLEN, W. J. ELSWORTH, and W. HARRISON & CO., LTD.: *Drainage Inspection Chamber.*

For inspection chambers a block of earthenware or the like having a channel formed therein, said block being provided with a recessed part at one end of said channel to receive a pipe end.

17,199 of 1902.—J. TAYLOR: *Automatic Fire-Extinguishers or Sprinklers and Apparatus therefor.*

In an automatic fire-extinguisher or sprinkler the use of a frangible glass strut or support, filled, or partially filled with volatile spirit or other expansive fluid which boils at a determined temperature according to the ultimate temperature at which the completed sprinkler is required to operate, the glass strut or support being affected by heat the volatile spirit or expansive fluid would assume a gaseous condition but for the fact that it is held in a hermetically-sealed chamber, and when the prearranged temperature is attained, the globe of the glass strut or support is burst by expansion, and instantly there is a communication to the atmosphere the whole of the contents assume a gaseous form and explode, blowing the glass strut or support into minute particles and freeing the water valve.

17,379 of 1902.—P. COTTANCIN and A. VYE-PARMINTER: *Reinforced Bricks and Brickwork.*

By this invention a brick of any suitable material is made with perforations or grooves through, or in which wires, chains, rods, or tubes are passed or placed, whereupon the perforation or groove is filled up with some suitable material cement or molten metal. When these bricks, or any others, are built to form brickwork, the joints between the bricks are similarly filled with cement having wires embedded in it. Instead of filling the perforations or grooves after the wires have been placed therein, the wires, or the like, may be attached to each other mechanically. In completing walls these reinforced bricks may be used at intervals, and the intervening spaces may be filled with any desired brickwork.

17,580 of 1902.—B. J. B. MILLS (Seigle): *Manufacture of Artificial Building Materials.*

The manufacture of artificial building materials by the following process, viz., calamine is calcined; it is then carefully mixed with lime; sand is then mixed with the mixture of lime and calamine in the proportion of about 90 per cent. of sand to 10 per cent. of limed calamine; the mass is moistened to obtain a sufficiently plastic paste; the paste is then moulded, pressed, and removed from the moulds, and the moulded products are submitted, in closed chambers, to the action of steam at a pressure of 8 to 10 kilogrammes.

16,702 of 1902.—W. T. SUGG: *Lamps for Incandescent Gas Lighting.*

Suspending lamps for incandescent gas lighting by

* All these applications are in the stage to which opposition to the grant of Patents upon them can be made.

means of tubular, coiled, metal, gas supply-pipes, such coils constituting in tension anti-vibration devices.

21,423 of 1902.—H. N. BAXTER: *Means for Deadening or Reducing Exterior Noises Audible in Buildings.*

Means for excluding or deadening exterior noises, consisting of two or more sheets or panes of glass or other transparent or translucent material, having air space between them and mounted in a suitable frame or support.

9,574 of 1903.—SUTCLIFFE, SPEAKMAN, & CO., LTD., and E. R. SUTCLIFFE: *Construction of Moulds for Brickmaking Machinery and the Like.*

In moulds for the table of a brickmaking machine, the combination with reversible liners formed with fitting projections and recesses, of corresponding recesses formed in the body of the table to engage the projections of the liners, a space at one end for the insertion of the liners and a packing-piece for filling said space.

9,619 of 1903.—D. ISOARD: *Blocks and Slabs for Building Purposes.*

Filleted or grooved blocks or slabs of beton or cement strengthened with metallic linings of all sizes and coloured, or otherwise, with, or without, architectural designs of any character, according to the parts of the constructions or buildings for which they are intended.

9,938 of 1903.—O. STREUBEL: *Flooring.*

This consists of applying cork, reduced to pieces and agglomerated to the building of flooring.

5,753 of 1903.—J. J. PLUCKER: *Fireproof Casings for Elevators, Staircases, and the Like.*

A casing for elevators, staircases, and the like, extending from the top to the bottom of a building by a series of pivotted shutters mounted in the casing and capable of being closed and opened simultaneously for all stories by suitable mechanism located upon any one of said stories.

6,849 of 1903.—H. J. HADDAN (Crozier): *Process of Making Bricks or Blocks or other Cementitious Products or Artificial Stone.*

An improvement in making a cementitious product or artificial stone, consisting in forming a compact porous mass of moist and unset cementitious material; then covering an external surface of the said compacted mass with a cementitious liquid and confining the said liquid externally of the said surface, then exerting further pressure upon aforesaid compacted mass to spread the latter and thereby force or run moisture from the said liquid and facing into the pores of the aforesaid compacted mass, and then permitting the resulting product to set and harden.

MEETINGS.

TUESDAY, JULY 14.

Institute of Sanitary Engineers, Ltd.—Provincial summer meeting at Wolverhampton.

WEDNESDAY, JULY 15.

Institute of Sanitary Engineers, Ltd.—Meeting at Wolverhampton (continued).

Builders' Foremen and Clerks of Works' Institution.—Half-yearly meeting of the members. 8 p.m.

Builders' Benevolent Institution.—Annual General Meeting. 3 p.m. Committee Meeting. 3.30 p.m.

THURSDAY, JULY 16.

Institute of Sanitary Engineers, Ltd.—Meeting at Wolverhampton (concluded).

London Master Builders' Association.—Council at 4 p.m.

JULY 20 TO 25.

The Architectural Association.—Annual excursion, Worcester and district.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

June 16.—By GEO. RICHARDS (at Templecombe).

Templecombe, Somerset.—Yew Tree Farm, 58 a. 1 r. 35 p., f.	£4,250
Coombe Throop Farm, 64 a. 0 r. 20 p., f.	3,600
Four cottages and 2 a. 0 r. 35 p., f.	360
Hanging Ground and Sweet's Ground enclosures, 19 a. 2 r. 29 p., f.	1,270

June 18.—By BIDWELL & SONS (at Ely).

Soham, Cambs.—The Henny Farm, 484 a. 2 r. 22 p., f., y.r. 330*l.*	9,200

By R. & C. SNELL (at Axminster).

Membury, Devon.—Land and Mill Dairy farms, 186 a. 2 r. 33 p., f.	3,600
Various enclosures, 18 a. 2 r. 2 p., f.	495

June 19.—By THOMPSON, WHITTON, & LAING (at Exeter).

Topsham, Devon.—Clyst View Farm, 16 a. 0 r. 8 p., f., y.r. 45*l.*	1,000
Blakesley, Northants.—Hootten's Farm, 136 a. 0 r. 11 p., f.	4,490

June 23.—By PEIRCE & THORPE, with THOMPSON, WHITTON, & LAING (at Towcester).

Pattishall, Northants.—Bury Closes, 34 a. 3 r. 34 p., f.	1,750
Bird's Close, 12 a. 1 r. 33 p., f.	430
Hitchcock's Farm, 89 a. 0 r. 5 p., f., y.r. 132*l.*	3,000
Cold Higham, &c., Northants.—The Down's Farm, 130 a. 0 r. 2 p., f., y.r. 110*l.*	1,650

June 24.—By PROTHEROE & MORRIS (on the estate).

Ashford, Middlesex.—Station-rd., &c., 53 plots of freehold building land (in lots)	2,141
June 25.—By GRIMLEY & SON (at Birmingham).	
Yardley Wood, Worcester.—Yew Tree Farm, 33 a. 0 r. 2 p., f.	£1,650
Trittiford House Estate, 37 a. 0 r. 22 p., f.	3,200
Two enclosures, 14 a. 1 r. 15 p., f.	1,670
Bretforton, Worcester.—The Larkborough Estate, 151 a. 3 r. 24 p., f. (in lots)	2,800

By BIDDELL & BLENCOWE (at Sudbury).

Belchamp St. Paul, Essex.—A small holding, 10 a. 0 r. 11 p., f.	300
Loveland's Estate, 208 a. 1 r. 1 p., f. and c.	2,200
Hadleigh, Suffolk.—Elm Lodge and 20 a. 1 r. 27 p., f., p.	650
The Lodge Farm, 74 a. 3 r. 12 p., f. and c.	620

By WINCH & SON (at Maidstone).

Cranbrook, &c., Kent.—Portions of the Sissinghurst Castle Estate, 151 a. 2 r. 23 p., f.	10,170

By SEWELL, BARNES & BRERETON (at Bungay).

Broome, &c., Norfolk.—A freehold farm, 155 a. 1 r. 27 p.	2,650
A small holding; also several enclosures of land, 53 a. 3 r. 27 p., f.	1,895

By BRODIE, TIMBS, & CO. (at Barnet).

Barnet, Herts.—Fitzjohn's-av., &c., 33 plots of freehold building land (in lots)	9,324

June 26.—By BELLAMY & CO. (at Walham Green).

Haggerston.—84, Whiston-st., f., w.r. 31*l.* 4s.	320

By CHAS. FOSTER & SON (at Chelmsford).

High Roothing, Essex.—Hubbard's Farm, 25 a. 2 r. 22 p., f.	250
Attridge's Farm, 46 a. 0 r. 37 p., f.	505
Porter's Manor Farm, 65 a. 2 r. 18 p., f.	700
Two freehold cottages, w.r. 9*l.*	170

June 27.—By DILLEY, SON, & READ (at Huntingdon).

Little Stukeley, Hunts.—Enclosures of land, 53 a. 2 r. 18 p., f.	1,510
Alconbury, Hunts.—Enclosures of land, 12 a. 2 r. 9 p., f. and c.	280
Walpole, Norfolk.—Neep's Farm, 104 a. 0 r. 28 p., f.	3,600
West Walton, Norfolk.—Harp's Hall Farm, 106 a. 3 r. 12 p., f.	3,787

By G. D. COFF (at Torrington).

Beaford, Devon.—Upcott Estate, 371 a. 3 r. 10 p., f.	5,400

By Messrs. CHALK (at Cambridge).

Great Chesterford, Essex.—Burton Wood Farm, 142 a. 3 r. 19 p., f., p.	2,500

By HAMPTON & SONS (at Reading).

Ipsden, Oxon.—Alma-cottage and 2 a. 1 r. 6 p., f., y.r. 18*l.*	385
A freehold enclosure, 1 a. 3 r. 32 p.	125
Victoria Cottage, f., y.r. 13*l.* 16s.	335
Two freehold cottages, y.r. 13*l.*	200
Freehold orchard ground, 1 a. 0 r. 3 p.	155
Berinshill Wood, 28 a. 3 r. 25 p., f.	660
Fludger's Wood, 21 a. 0 r. 1 p., f.	320

June 29.—By JOHN BOTT & SON.

Lambeth.—37, Lambeth-walk (site), f., p.	100

By C. RAWLEY, CROSS, & CO.

Islington.—4 and 6, Rocliffe-st., u.t. 35 yrs., g.r. 12*l.*, y.r. 64*l.*	550
Fulham.—25, Gironde-rd. (flats), f., w.r. 91*l.*	725
South Kensington.—132, Finborough-rd., u.t. 60½ yrs., g.r. 10*l.*, y.r. 52*l.*	480
Ealing, 29, The Av., u.t. 75 yrs., g.r. 10*l.*, y.r. 55*l.*	550
Teddington.—3, 4, and 6, Riverside Villas, u.t. 80 yrs., g.r. 130*l.*	1,195

By GOUGH & DOVE.

Stroud Green.—43, Mount View-rd., u.t. 73 yrs., g.r. 14*l.*, p.	910

By ELLIOTT, SON, & BOYTON.

Oxford-st.—67, Berners-st., and 6, Wells-st., s., also premises in Castle-mews, area 3,700 ft., u.t. 19 yrs., g.r. 185*l.*, y.r. 718*l.* 16s.	2,500
Kensal Green.—762, Harrow-rd., s., f., y.r. 60*l.*	1,250
Ealing.—7, Grange-rd., u.t. 65½ yrs., g.r. 16*l.*, y.r. 100*l.*	895

By ELLIS & PALMER.

East Grinstead, Sussex.—Windmill-la., a plot of land, 1 a. 0 r. 15 p., f.	300

By FRANKLIN, GALE, & NEWTON.

Sotwell, Berks.—North Farm, 119 a. 2 r. 31 p., f., y.r. 140*l.*	2,700
Wallingford, Berks.—The Severalls Estate, 251 a. 2 r. 22 p., f.	6,200

By G. B. HILLIARD & SON.

Nevendon, &c., Essex.—Little Bromford's Farm, 113 a. 1 r. 33 p., f., p.	1,460
The Little Mead, 3 a. 0 r. 15 p., f.	115
Ramsden Crays, Essex.—Crays Hill, freehold house and shop, y.r. 13*l.*	275

By A. H. TURNER & CO.

Burgess Hill, Sussex.—Franklands and 20 a., f.	5,550

By WEATHERALL & GREEN.

Shepherd's Bush.—Blomfield-rd., i.g. rents 72*l.*, u.t. 62 yrs., g.r. nil.	1,360
Blomfield-rd., two leasehold peppercorn g. rents, u.t. 62 yrs.	180

By VENTOM, BULL, & COOPER.

City of London.—4 and 5, Old Change, area 1,530 ft., building lease for 80 yrs., let at per annum	460

By NORMAN & SON (at Stratford).

West Ham.—41 to 77 (odd), Arthingworth-st., u.t. 80 yrs., g.r. 66*l.* 10s., e.r. 469*l.* 6s.	1,575

June 30.—By DAVID BURNETT & CO.

Stoke Newington.—15, Springdale-rd., u.t. 63½ yrs., g.r. 6*l.* 4s. 6d., w.r. 76*l.* 14s.	430

By DEBENHAM, TEWSON, & CO.

Dulwich.—Goodrich-rd., f.g.r. 18*l.*, reversions in 85 yrs.	450
Hackney.—117, Amhurst-rd., u.t. 67 yrs., g.r. 8*l.*, y.r. 50*l.*	540
218, Amhurst-rd., u.t. 44½ yrs., g.r. 10*l.*, y.r. 70*l.*	700
Highbury.—97, Riversdale-rd., u.t. 67 yrs., g.r. 8*l.* 8s., y.r. 36*l.*	115

By FISHER, STANHOPE, & DRAKE.

Stoke Newington.—141, Evering-rd., u.t. 70 yrs., g.r. 10*l.*, e.r. 65*l.*	600
Dalston.—2, St. Mark's-ter., u.t. 63 yrs., g.r. 6*l.*, e.r. 43*l.*	450

By HAMPTON & SONS.

Anslow, Staffs.—Freehold enclosures, 52 a. 0 r. 7 p.	2,700

By HOBSON, RICHARDS, & CO.

Dalston.—39, Malvern-rd., u.t. 38 yrs., g.r. 4*l.* 7s. 6d., q.r. 34*l.*	355
51, Mayfield-rd., u.t. 34½ yrs., g.r. 5*l.*, q.r. 32*l.*	315

By MANSELL & ROWE.

Norwood.—22, 24, 26, and 30, High View-rd., u.t. 74 yrs., g.r. 48*l.* 4s., y.r. 148*l.*	£1,300

By RAWLINS & CO.

Wandsworth.—Galveston-rd., f.g. rents 62*l.*, reversion in 83 yrs.	1,580
Oakhill-rd., f.g. rents 26*l.*, reversion in 82½ yrs.	695
Ealing.—Drayton-gdns., f.g. rents 27*l.* 10s., reversion in 94½ yrs.	670
Fulham.—Lillie-rd., f.g. rents 19*l.* 10s., reversion 87 yrs.	480
Brecon-rd., f.g.r's 16*l.* 16s., reversion in 87 yrs.	400
Westbourne Park.—Golborne-gdns., f.g.r.'s 29*l.*, reversion in 63½ yrs.	690
Harlesden.—Fortune Gate-rd., f.g.r.'s 30*l.*, reversion in 86½ yrs.	743
Plumstead, Kent.—Orchard-rd., f.g.r.'s 21*l.*, reversion in 59½ yrs.	520
Orissa-rd., f.g.r.'s 60*l.*, reversion in 51½ yrs.	1,508
Crouch End.—Drylands-rd., f.g.r.'s 39*l.*, reversion in 84¾ yrs.	1,014
Tottenham.—Brampton-rd., f.g.r.'s 16*l.* 16s., reversion in 84½ yrs.	396
East Ham.—Lathom-rd., f.g.r.'s 63*l.*, reversion in 97 yrs.	1,600
Ilford, Essex.—Khartoum-rd., f.g.r.'s 50*l.* 8s., reversion in 97 yrs.	1,180
Grange-rd., f.g.r.'s 36*l.* 2s. 6d., reversion in 990 yrs.	865
Walthamstow.—South-gr., &c., f.g.r. 20*l.*, reversion in 85 yrs.	460
Maidenhead, Berks.—Ray Park-av., &c., f.g.r.'s 133*l.*, reversion in 61 yrs.	3,965
Market-st., f.g.r. 20*l.*, reversion in 59½ yrs.	755
St. Mark's-rd., f.g.r. 25*l.*, reversion in 60 yrs.	530

By TUCKETT & SON (at Chingford).

Chingford.—Low-st., Dell's Farm, 3 a. 0 r. 6 p., f.	500
Low-st., freehold cottage and 2 a. 2 r. 7 p.	350

By BOYTON, PEGRAM, & CO. (at Walham Green).

Fulham.—108, Bonsart-rd., u.t. 94½ yrs., g.r. 6*l.*, w.r. 41*l.* 12s.	295
Chelsea.—30, Upcerne-st., u.t. 79 yrs., g.r. 6*l.* 16s., w.r. 50*l.* 14s.	300

By CRAFTER, HARRIS, & CO. (at Mason's Hall Tavern).

Forest Hill.—Brockley Rise, The St. Germain's Tavern, u.t. 69 yrs., y.r. 140*l.*, with goodwill	21,000

By ORGILL, MARKS, & LAWRENCE (at Mason's Hall Tavern).

Pimlico.—Tachbrook-st., The Enterprise, p.-h., y.r. 105*l.*, with goodwill; and 20, Charlwood-st., s., y.r. 60*l.*; also i.g.r. 30*l.*, u.t. 30 yrs., g.r. 4*l.*	31,000

By J. STRAKER & SON (at Abergavenny).

Llanvihangel Crucorney, &c., Mon.—The Berry and Pwll Mair Farms, also Upper Park Cottage, area 125 a. 2 r. 37 p., f. (in one lot)	2,100
Crasswall, &c., Hereford.—The Middle Cwm Farm, 175 a. 2 r. 15 p., f. and c.	1,610
Llanvapley, &c., Mon.—The Middle Ton Farm, 85 a. 0 r. 6 p., f.	2,690

By MELLERSH'S (at Godalming).

Godalming, Surrey.—Bushbridge-la., a freehold building estate, 16 a. 3 r. 12 p.	4,000
Crown Pits, seven freehold cottages	1,250

July 1.—By B. BAILEY & CO.

Ilford, Essex.—Wellesley-rd., &c., the Ilford Sports Ground, 7¼ acres, f., p.	9,600
Wards-la., part of the Aldborough Park Estate, 9 a. 2 r. 24 p., f., p.	5,700

By BROAD, WILTSHIRE, & PENNY.

Kensington.—17 and 19, Beaumont-rd., f., y.r. 87*l.*	1,010
54 and 56, Dieppe-st., f., w.r. 57*l.* 16s.	915
63 to 71 (odd), Dieppe-st., f., w.r. 172*l.* 12s.	2,100
Sutton, Surrey.—1 and 2, Lind-villas, u.t. 52½ yrs., g.r. 10*l.* 10s., y.r. 66*l.*	485
Wandsworth.—5 to 8, Basnett-rd., u.t. 62 yrs., g.r. 20*l.*, w.r. 131*l.* 6s.	880
Brompton.—Richmond-rd., i.g.r.'s 94*l.* 10s., u.t. 63 yrs., g.r. 47*l.* 10s.	830
Kramer-mews, i.g.r.'s 130*l.*, u.t. 63 yrs., g.r. 72*l.*	930

By H. DONALDSON & SON.

Fleet-st.—7½ and 8, Gunpowder-alley, u.t. 47½ yrs., g.r. 30*l.*, w.r. 106*l.* 12s.	410

By FAREBROTHER, ELLIS, & CO.

Covent Garden.—Maiden-la., f.g.r. 34*l.*, reversion in 14 yrs.	2,000
Fulham.—Fulham-rd., f.g.r. 32*l.*, reversion in 34½ yrs.	1,010

By FOSTER & CRANFIELD.

Leicester-sq.—21, Green-st., s., area 800 ft., f., y.r. 16*l.*	5,460
Soho.—103, Wardour-st., s., f., y.r. 85*l.*	1,750
15, Rupert-st., s., f., y.r. 150*l.*	4,075
Oxford-st.—38, Berwick-st., s., f., y.r. 130*l.*	2,750
3 and 4, Soho-st., s., area 1,650 ft., f., y.r. 350*l.*	7,500
Long-acre.—37, Neal-st., and 15, Neal's-yard (shop and warehouse), f., y.r. 115*l.*	2,400
Chelsea.—King's-rd., f.g. rents 60*l.*, reversion in 39 yrs.	5,960
Anderson-st., f.g. rents 20*l.*, reversion in 39 yrs.	1,030
Coulson-st., &c., peppercorn g.r.'s, reversion in 39 yrs.	2,240

By CECIL HOBDAY.

Tooting.—77 to 91 (odd), Selkirk-rd., u.t. 75 yrs., g.r. 42*l.*, w.r. 249*l.* 12s.	1,500

By FRANK JOLLY & CO.

Limehouse.—73, Rhodeswell-rd., s., u.t. 52 yrs., g.r. 3*l.*, e.r. 36*l.*	355

By A. M. NEWCOMBE.

Penge.—42, Beckenham-rd., u.t. 59½ yrs., g.r. 10*l.*, p.	300

By NOTLEY & CO.

Basildon, Essex.—Enclosures of land with buildings thereon, 29 a. 1 r. 10 p., f.	560

By G. PEARCE & SONS.

Manor Park.—Sheridan-rd., u.t. 94 yrs., g.r. 4*l.* 10s., e.r. 26*l.*	205

By WESTMORE & YOUNG.

Anerley.—30, Thicket-rd., u.t. 214 yrs., g.r. 13*l.*, e.r. 50*l.*	400

By GEO. HONE (at Tewkesbury).

Deerhurst, &c., Glos.—Walton Hill Farm, 164 a. 1 r. 13 p., f.	3,500
Walton Cardiff, &c., Glos.—Walton Manor Estate, 215 a. 2 r. 36 p., f.	4,306
Elmstone Hardwick, Glos.—Cox's Mead and The Patch, 12 a. 2 r. 7 p., f.	380

July 2.—By G. ERNEST CLARK.

Walthamstow.—1, Upper Walthamstow-rd., u.t. 76 yrs., g.r. 7*l.*, r. 50*l.* £420
2 and 24, Merton-rd., f., y.r. 84*l.* 895

By LEAGE'S.

Stoke Newington.—11, Dumont-rd., u.t. 71 yrs., g.r. 7*l.* 10s., y.r. 0*l.* .....
Homerton.—241, Glyn-rd., s., u.t. 75 yrs., g.r. 7*l.* 10s., y.r. 40*l.* 330

By C. C. & T. MOORE.

Hackney.—37, Queen Anne-rd., u.t. 42 yrs., g.r. 5*l.*, y.r. 40*l.* 335
Victoria Park.—352, Old Ford-rd., u.t. 50½ yrs., g.r. 4*l.*, y.r. 28*l.* .....
Bethnal Green.—110, Green-st., s., u.t. 16¼ yrs., g.r. 5*l.* 3s., y.r. 45*l.* 245
Stratford.—46 to 52 (even), Keogh-rd., f., w.r. 93*l.* 12s. .....
37 to 47 (odd), Louise-rd., u.t. 75 yrs., g.r. 16*l.* 10s., w.r. 145*l.* 12s. 320
Stepney.—11, Wellesley-st., u.t. 20 yrs., g.r. 3*l.* 10s., y.r. 26*l.* .....

By H. MUSKETT & Co.

Wood Green.—68, Palmerston-rd., u.t. 94 yrs., g.r. 8*l.* 8s., y.r. 42*l.* 210
By NEWBON, EDWARDS, & SHEPHARD.
Barnsbury.—85, Roman-rd., u.t. 58 yrs., g.r. 6*l.* 10s., w.r. 36*l.* 8s. .....
Hackney.—17, 39, and 41, Orchard-pl., u.t. 35 yrs., g.r. 15*l.*, w.r. 80*l.* 12s. 765
Tottenham.—87, Grove Park-rd., u.t. 79 yrs., g.r. 6*l.*, w.r. 31*l.* 4s. .....

By STIMSON & SONS.

Chelsea.—269, King's-rd., s., u.t. 68 yrs., g.r. 20*l.*, y.r. 120*l.* 930
Peckham.—38, 40, 42, and 44, Commercial-rd., f., y.r. 128*l.* .....
Balham.—Upper Tooting Pk., f.g.r.'s 47*l.* 16s., reversion in 96 yrs. 145
Hosack-rd., f.g.r.'s 50*l.* 10s., reversions in 97 and 94 yrs. .....
Southwark.—18, 20, and 22, St. Thomas'-st. (offices), u.t. 44 yrs., g.r. 74*l.* 12s. 2d., y.r. 315*l.* .....
Peckham.—10, Parkstone-rd., u.t. 61½ yrs., g.r. 5*l.* 5s., w.r. 41*l.* 12s. .....
29, Hill-st., with yard, saw mills, &c., in rear, u.t. 28½ yrs., g.r. 8*l.*, e.r. 120*l.* .....
Poplar.—1 to 5, Norfolk-st., u.t. 46½ yrs., g.r. 22*l.*, w.r. 145*l.* 12s. .....

June 3.—By F. DOD & Co.

Stoke Newington.—166 and 168, High-st., s., u.t. 47½ yrs., g.r. 40*l.*, y.r. 325*l.* .....
36, Green-lanes, u.t. 57 yrs., g.r. 5*l.*, y.r. 38*l.* ..
Twickenham.—7, Sandycombe-rd., u.t. 77 yrs., g.r. 9*l.*, y.r. 40*l.* .....

By G. GOULDSMITH, SON, & Co.

Chelsea.—18, Oakley-st., u.t. 39½ yrs., g.r. 8*l.*, y.r. 65*l.* .....
Pimlico.—53, Gloucester-st., u.t. 28 yrs., g.r. 9*l.*, y.r. 60*l.* .....
Maida Vale.—36, 37, 38, 39, and 42, Elgin-ter., u.t. 58½ yrs., g.r. 30*l.*, y.r. 225*l.* .....
2 to 16 (even), Elgin-mews South, u.t. 56½ yrs., g.r. 42*l.*, y.r. 295*l.* .....

By J. HIBBARD & SONS.

High Barnet, Herts.—Hadley Green, a freehold house, with ground and stabling, p. 1,030

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. for beer-house; p.h. for public-house; o. for offices; s. for shops.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.	
Hard Stocks	1 15 0	per 1,000 alongside, in river.
Rough Stocks and Grizzles.....	1 12 0	" " "
Facing Stocks....	2 12 0	" " "
Shippers	2 5 0	" " "
Flettons	1 7 6	" at railway depôt
Red Wire Cuts ..	1 12 0	" " "
Best Fareham Red	3 12 0	" " "
Best Red Pressed Ruabon Facing	5 0 0	" " "
Best Blue Pressed Staffordshire ..	4 5 0	" " "
Do. Bullnose	4 11 0	" " "
Best Stourbridge Fire Bricks	4 8 0	" " "
GLAZED BRICKS.		
Best White and Ivory Glazed Stretchers.....	13 0 0	" " "
Headers	12 0 0	" " "
Quoins, Bullnose, and Flats.....	17 0 0	" " "
Double Stretchers	19 0 0	" " "
Double Headers..	16 0 0	" " "
One Side and two Ends.....	19 0 0	" " "
Two Sides and one End	20 0 0	" " "
Splays, Chamfered, Squints.....	20 0 0	" " "
Best Dipped Salt Glazed Stretchers and Headers	12 0 0	" " "
Quoins, Bullnose, and Flats.....	14 0 0	" " "
Double Stretchers	15 0 0	" " "
Double Headers..	14 0 0	" " "
One Side and two Ends.....	15 0 0	" " "

PRICES CURRENT (*Continued*).

BRICKS, &c.

	£ s. d.	
Two Sides and one End	15 0 0	per 1,000 at railway depot.
Splays Chamfered, Squints.....	14 0 0	" " "
Second Quality White and Dipped Salt Glazed	2 0 0	" less than best.

	s. d.	
Thames and Pit Sand	6 0	per yard, delivered.
Thames Ballast	6 0	" "
Best Portland Cement	30 0	per ton, delivered.
Best Ground Blue Lias Lime..	20 6	" "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 10s 6d. per yard, delivered.
Stourbridge Fire-clay in sacks 27s. 6d. per ton at rly. dpt.

STONE.

	s. d.	
Ancaster in blocks	1 11	per ft. cube, deld rly. depôt.
Bath "	1 7	" "
Farleigh Down Bath ..	1 7	" "
Beer in blocks	1 6	" "
Grinshill "	1 10	" "
Brown Portland in blocks	2 2	" "
Darley Dale in blocks..	2 4	" "
Red Corsehill "	2 5	" "
Closeburn Red Freestone	2 0	" "
Red Mansfield "	2 4	" "

YORK STONE—*Robin Hood Quality.*

	s. d.	
Scappled random blocks	2 10	per ft. cube, deld. rly. depôt.
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 3	per foot super. "
6 in. Rubbed two sides Ditto, Ditto	2 6	" "
3 in. Sawn two sides slabs (random sizes)..	0 11½	" "
2 in. to 2½ in. Sawn one side slabs (random sizes)	0 7½	" "
1½ in. to 2 in. ditto, ditto	0 6	" "
BEST HARD YORK—		
Scappled random blocks	3 0	per ft. cube "
6 in. sawn two sides, landings to sizes (under 40 ft. sup.)	2 8	per ft. super. "
6 in. Rubbed two sides Ditto	—	" "
3 in. sawn two sides slabs (random sizes)	1 2	" "
2 in. self-faced random flags.....	0 5	" "
Hopton Wood (Hard Bed) in blocks	2 3	per ft. cube.
" " " 6 in. sawn both sides landings	2 7	deld. rly. depôt. per ft. super. deld. rly. depôt
" " " 3 in. do.	1 2½	" "

SLATES.

in. in.	£ s. d.	
20×10 best blue Bangor..	13 2 6	per 1000 or 1200 at ry.dep.
20×12 " " " ..	13 17 6	" "
20×10 best seconds "	12 15 0	" "
20×12 " " "	13 10 0	" "
16×8 best "	7 0 0	" "
20×10 best blue Portmadoc ..	12 5 0	" "
16×8 best blue Portmadoc	6 5 0	" "
20×10 best Eureka unfading green....	15 2 6	" "
20×12 " "	17 8 6	" "
18×10 " "	12 10 0	" "
16×8 " "	10 5 0	" "
20×10 permanent green	11 0 0	" "
18×10 " "	9 5 0	" "
16×8 " "	6 10 0	" "

TILES.

	s. d.	
Best plain red roofing tiles..	42 0	per 1,000, at rly. depôt.
Hip and valley tiles....	3 7	per doz. " "
Best Broseley tiles	50 0	per 1,000 " "
Do. Ornamental Tiles	52 6	" " "
Hip and valley tiles....	4 0	per doz. " "
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6	per 1,000 " "
Do. ornamental Do.	60 0	" " "
Hip tiles	4 0	per doz. " "
Valley tiles.....	3 0	" " "
Best Red or Mottled Staffordshire Do. (Peakes)	51 9	per 1,000 " "
Do. Ornamental Do.	54 6	" " "
Hip tiles	4 1	per doz. " "
Valley tiles.....	3 8	" " "
Best "Rosemary" brand plain tiles	48 0	per 1,000 " "
Do. Ornamental Do.	50 0	" " "
Hip tiles	4 0	per doz. " "
Valley tiles	3 8	" " "

WOOD.

	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.....	15 10 0	16 10 0
Deals: best 3 by 9.....	14 10 0	15 10 0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.....	11 10 0	12 10 0
Battens: best 2½ by 6 and 3 by 6 ..	0 10 0	less than 7 in. and 8 in.
Deals: seconds'.....	1 0 0	less than best
Battens: seconds	0 10 0	" " "
2 in. by 4 in. and 2 in. by 6 in. ..	9 0 0	9 10 0
2 in. by 4½ in. and 2 in. by 5 in. ..	8 10 0	9 10 0
Foreign Sawn Boards—		
1 in. and 1¼ in. by 7 in.	0 10 0	more than battens.
¾ in.	1 0 0	"
Fir timber: Best middling Danzig or Memel (average specification	At per load of 50 ft. 4 10 0	5 0 0
Seconds	4 5 0	4 10 0
Small timber (8 in. to 10 in.)	3 12 6	3 15 0
Small timber (6 in. to 8 in.).....	3 0 0	3 10 0
Swedish balks	2 15 0	3 0 0
Pitch-pine timber (30 ft. average)..	3 5 0	3 15 0

PRICES CURRENT (*Continued*).

WOOD.

JOINERS' WOOD.

	At per standard. £ s. d.	£ s. d.
White Sea: First yellow deals, 3 in. by 11 in.....	23 0 0	24 0 0
3 in. by 9 in.	21 0 0	22 10 0
Battens, 2½ in. and 3 in. by 7 in.	17 0 0	18 10 0
Second yellow deals, 3 in. by 11 in.	18 10 0	20 0 0
" " 3 in. by 9 in.	17 10 0	19 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0
Third yellow deals, 3 in. by 11 in. and 9 in.	15 10 0	16 10 0
Battens, 2½ in. and 3 in. by 7 in.	11 10 0	12 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	21 0 0	22 10 0
Do. 3 in. by 9 in.....	18 0 0	19 10 0
Battens.....	13 10 0	15 0 0
Second yellow deals, 3 in. by 11 in.....	16 0 0	17 0 0
Do. 3 in. by 9 in.	14 10 0	16 0 0
Battens.....	11 0 0	12 10 0
Third yellow deals, 3 in. by 11 in.....	13 10 0	14 0 0
Do. 3 in. by 9 in.	13 0 0	14 0 0
Battens	10 0 0	11 0 0
White Sea and Petersburg:—		
First white deals, 3 in. by 11 in.	14 10 0	15 10 0
" " 3 in. by 9 in.	13 10 0	14 10 0
Battens.....	11 0 0	12 0 0
Second white deals 3 in. by 11 in.	13 10 0	14 10 0
" " " 3 in. by 9 in.	12 10 0	13 10 0
" " " battens.....	9 10 0	10 10 0
Pitch-pine: deals	16 0 0	18 0 0
Under 2 in. thick extra	0 10 0	1 0 0
Yellow Pine—First, regular sizes ..	33 0 0	upwards.
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Yellow Pine Oddments	20 0 0	22 0 0
Kauri Pine—Planks, per ft. cube..	0 3 6	0 4 6
Danzig and Stettin Oak Logs—		
Large, per ft. cube	0 2 6	0 3 6
Small " "	0 2 3	0 2 6
Wainscot Oak Logs, per ft. cube ..	0 5 0	0 5 6
Dry Wainscot Oak, per ft. sup. as inch	0 0 7	0 0 8
¾ in. do. do.	0 0 6½	- - -
Dry Mahogany—Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Dry Walnut, American, per ft. sup. as inch	0 0 10	0 1 0
Teak, per load	17 0 0	21 0 0
American Whitewood Planks—		
Per ft. cube	0 4 0	- - -

Prepared Flooring—	Per square.	
1 in. by 7 in. yellow, planed and shot.....	0 13 6	0 17 6
1 in. by 7 in. yellow, planed and matched.....	0 14 0	0 18 0
1¼ in. by 7 in. yellow, planed and matched.....	0 16 0	1 1 6
1 in. by 7 in. white, planed and shot.....	0 11 6	0 13 6
1 in. by 7 in. white, planed and matched.....	0 12 0	0 14 0
1¼ in. by 7 in. white, planed and matched.....	0 14 6	0 16 6
¾ in. by 7 inch yellow matched and beaded or V-jointed boards	0 11 0	0 13 6
1 in. by 7 in. do. do. do.	0 14 0	0 18 0
¾ in. by 7 in. white do. do.	0 10 0	0 11 6
1 in. by 7 in. do. do. do.	0 11 6	0 13 6

6-in. at 6d. to 9d. per square less than 7-in.

JOISTS, GIRDERS, &c.

	In London, or delivered. Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	6 5 0	7 5 0
Compound Girders " "	8 2 6	9 5 0
Angles, Tees and Channels, ordinary sections	7 17 6	8 17 6
Flitch Plates	8 5 0	8 15 0
Cast Iron Columns and Stanchions, including ordinary patterns	7 2 6	8 5 6

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON—		
Common Bars.....	7 10 0	8 0 0
Staffordshire Crown Bars, good merchant quality	8 0 0	8 10 0
Staffordshire "Marked Bars" ..	10 10 0	- - -
Mild Steel Bars	8 15 0	9 5 0
Hoop Iron, basis price.....	9 0 0	9 5 0
" " galvanised.....	16 0 0	- - -

(* And upwards, according to size and gauge.)

Sheet Iron, Black.—		
Ordinary sizes to 20 g.	9 15 0	- - -
" " to 24 g.	10 15 0	- - -
" " to 26 g.	12 5 0	- - -
Sheet Iron, Galvanised, flat, ordinary quality—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.....	12 15 0	- - -
" " 22 g. and 24 g.	13 5 0	- - -
" " 26 g.....	14 5 0	- - -
Sheet Iron, Galvanised, flat, best quality:—		
Ordinary sizes to 20 g.....	16 0 0	- - -
" " 22 g. and 24 g.	16 10 0	- - -
" " 26 g.....	18 0 0	- - -
Galvanised Corrugated Sheets:—		
Ordinary sizes, 6 ft. to 8 ft. 20 g.	12 15 0	- - -
" " 22 g. and 24 g.	13 5 0	- - -
" " 26 g.....	14 0 0	- - -
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker ..	11 15 0	- - -
" " 22 g. and 24 g.	12 15 0	- - -
" " 26 g.	14 0 0	- - -
Cut nails, 3 in. to 6 in.	9 5 0	9 15 0

(Under 3 in. usual trade extras.)

LEAD, &c.

	Per ton, in London. £ s. d.	£ s. d.
LEAD—Sheet, English, 3 lbs. & up.	14 5 0	- - -
Pipe in coils	14 15 0	- - -
Soil pipe	17 5 0	- - -
Compo Pipe	17 5 0	- - -
ZINC—Sheet—		
Vieille Montagne ..... ton	27 5 0	- - -
Silesian	27 0 0	- - -

[*See also page 57.*

COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
Machinery for Lifting Boats	Austrian Government	100,000 Kronen, 75,000 Kronen, and 50,000 Kronen	Mar. 3, 1904

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., supplied by	Tenders to be delivered
Sewage Works, Agbrigg, near Wakefield	Sandell Magna U.D.C.	F. Massie, Surveyor, Tetley House, Wakefield	July 13
Road Works, Park-road, &c.	Watford R.D.C.	H. M. Turner, Watford-place, Watford	July 14
Sewerage Works	Aberdeen Town Council	W. Dyack, Civil Engineer, 41½, Union-street, Aberdeen	do.
Sewers, &c., Copland-road, Govan, N.B.	The Committee	J. Deas, Civil Engineer, 53, Bothwell-street, Glasgow	do.
House, Church-street, Egremont	Mr. G. D. Young	Jas. Cowan, Surveyor, Egremont	do.
Additions to Oil Cloth Works, Sowerby Bridge	Messrs. Sykes & Son	Jackson & Fox, Architects, 7, Rawson-street, Halifax	do.
Additions to Public Buildings	Brownhills U.D.C.	W. B. Chancellor, Architect, Public Buildings, Brownhills	do.
Boundary Walls at Cemetery, Dowlais	Merthyr Tydfil U.D.C.	T. F. Harvey, Engineer, Town Hall, Merthyr	do.
Re-erection of the Melbourne Mills, Morley, Yorks	Executors of the late Mr. Stockwell	Buttery & Birds, Architects, Queen-street, Morley	do.
Offices, Levenshulme	Manchester Corporation	J. Gibbons, Architect, 25, Cross-street, Manchester	do.
Rebuilding Church, Newchurch, near Warrington	.....	Travers & Ramsden, Architects, 44, Church-street, Leigh, Lancs	do.
Two Blocks of Houses, Devon-street, Halifax	.....	Lister Coates, Architect, Bank Chambers, Halifax	do.
*Sewers, Kensal Green	Willesden District Council	Council's Engineer, Dyne-road, Kilburn, N.W.	do.
*Boundary Wall, Neasden	do.	do.	do.
Queen Victoria Memorial, Vicarage-road, Rochdale	.....	Woodhouse & Co., Architects, 100, King-street, Manchester	July 15
Two Cottages, Trelewis, Treharris	.....	W. Dowdeswell, Architect, John-street, Treharris	do.
Footbridges, near Enfield Lock	Enfield U.D.C.	R. Collins, Surveyor, Council Offices, Enfield	do.
Asphalting Works	Blackpool Corporation	J. S. Brodie, Civil Engineer, Town Hall, Blackpool	do.
Cast-iron Pipes (9,672 tons)	Dublin Corporation	Spencer Harty, Engineer, City Hall, Dublin	do.
Additions to Electricity Station	Reigate Town Council	F. T. Clayton, Civil Engineer, Municipal Buildings, Reigate	do.
Asphalting Footways (12 months)	Blackpool Corporation	J. S. Brodie, Borough Engineer, Town Hall, Blackpool	do.
Paving Works, Hand-place	Walsall Corporation	Borough Surveyor, Bridge-street, Walsall	do.
Eighteen Labourers Cottages, Lurgan	Moira (Ireland) R.D.C.	W. W. Larmor, Civil Engineer, Banbridge	do.
Hotel, Porthcawl, Wales	Mr. T. Williams	Cook & Edwards, Architects, Masonic Buildings, Bridgend	do.
Foundry, Bridge-street, Batley	Messrs. J. Bagshaw & Sons, Ltd.	H. B. Buckley, Architect, 85, Commercial-street, Batley	do.
Brewery Offices, Cefn Coed, Wales	Pontycapel Brewery Co.	C. W. Pearce, Architect, Cefn Coed	do.
Two Houses, Smith House-lane, Lightcliffe, Yorks	.....	Sharpe & Waller, Architects, 32, Bradford-road, Brighouse	July 16
Villas, Heaton, Yorks	.....	Adkin & Hill, Architects, Bradford	do.
Lodge, Bickham, near Exeter	.....	E. H. Harbottle & Son, Architects, Exeter	do.
Isolation Hospital, near Stoke-upon-Trent	Cheadle R.D.C.	F. T. Inskip, Surveyor, Brookhouse, Cheadle	do.
Four Houses, Whitcliffe, Cleckheaton	.....	R. Castle & Son, Architects, Cleckheaton	do.
Church, Walton-le-Dale, near Preston, Lancs	The Building Committee	The Vicar, the Vicarage, Walton-le-Dale	do.
Additions to Police Station, Seabrook	Kent County Council	F. W. Ruck, County Surveyor, 86, Week-street, Maidstone	do.
Additions to Workhouse, Pleck-road	Walsall Guardians	H. E. Lavender, Architect, Bridge-street, Walsall	do.
School, Albion-road	Edinburgh School Board	—. Carfrae, Esq., Architect, 3, Queen-street, Edinburgh	do.
Street Works, Hardy and other Streets	Ramsbottom (Lancs) U.D.C.	T. H. Bell, Surveyor, Council Offices, Ramsbottom	do.
Lodge at Sanatorium, Canton	Cardiff Corporation	W. Harpur, Civil Engineer, Town Hall, Cardiff	do.
Two Cottages, Sherford Farm, Brixton, Devon	Sir F. G. A. F. E. Drake	Pitts & Sons, Architects, Barnstaple	do.
*Sewerage and Sewage Disposal Works	Godstone R.D.C.	A. Williams & Son, Civil Engineers, 14, Victoria-street, S.W.	do.
*Petty Sessional Hall, Recons'tion Heating Ap'ratus, &c	Kent County Council	County Surveyor, 86, Week-street, Maidstone	do.
Church, Birchgrove, Whitchurch, near Cardiff	.....	E. Seward, Architect, Cardiff	July 17
Works at Parish Church, Hunmanby (Yorks)	.....	C. Hodgson Fowler, Architect, Durham	do.
Rebuilding Church, St. Cyrus, N.B.	.....	James Lyall, Roadside, St. Cyrus, N.B.	do.
Builder's Work, Dundee Terrace	Edinburgh Corporation	R. Morham, City Architect, Edinburgh	do.
Sewers, &c., (4½ miles)	Oldbury U.D.C.	J. T. Eayrs, Civil Engineer, 39, Corporation-street, Birmingham	do.
Abattoir at Market, Brook-street	Preston Corporation	Borough Surveyor, Town Hall, Preston	do.
Chapel, Gilstead, Bingley	The Wesleyans	W. R. Nunns, Architect, Market-street, Bingley	do.
Sewerage Works	Kendal Corporation	R. H. Clucas, Civil Engineer, Town Hall, Kendal	do.
Paving Works, Trelfall-street	Preston Corporation	Borough Surveyor, Town Hall, Preston	do
Schools	Larbert (N.B.) Parish School Board	A. & W. Black, Architects, Falkirk	do.
Granite Road Metal, (900 tons)	Stamford Town Council	T. W. A. Hayward, Civil Engineer, 8, St. Mary's-street, Stamford	July 18
Sewerage Works, Oadby, Yorks	Blaby R.D.C.	Draper & Walters, Surveyors, Friar-lane, Leicester	do.
Additions to Schools, Ashburton	The Governors	R. E. Tucker, Ashburton	do.
Twenty Houses, Aberbeeg	Building Club	P. V. Jones, Architect, Hengoed	do.
Works at Chapel, Broadhempston	The Wesleyans	—. Johns, Esq., Woodbine Villa, Broadhempston	do.
Destructor Buildings at Sewage Works	Eccles (Lancs) Corporation	G. W. Willis, Engineer, Peel-green-road, Patricroft	do.
Slaughter House	Lancaster Corporation	Borough Surveyor, Town Hall, Lancaster	July 20
Engine House	Witham (Essex) U.D.C.	F. B. Courtney, Architect, 25, Victoria-street, S.W.	do.
Hall at Workmen's Institute, Ton, Pentre	Building Committee	J. Rees, Architect, Pentre	do.
Bridge Works	Pontypridd U.D.C.	P. R. A. Willoughby, Civil Engineer, Architect, Pontypridd	do.
Laying Underground Telephone Pipes	Manchester Corporation	City Surveyor, Town Hall, Manchester	do.
Additions to Lodge at Cemetery	Bebington (Cheshire) U.D.C.	W. Griffiths, Architect, 5, Hamilton-square, Birkenhead	do.
Water Supply Works	Knaresborough R.D.C.	R. Annakin, Engineer, 11, Dragon-Terrace, Horrogate	do.
Sewage Tanks, &c. Sandy Vale	Stalybridge Town Council	F. Schofield, Town Hall, Stalybridge	do.
Road Works, Clydach Vale	Cambrian Collieries, Ltd.	L. W. Llewellyn, Cambrian Collieries, Clydach Vale	do.
Forty-eight Cottages, Clydach Vale	do.	do.	do.
Street Works	Goole (Yorks) U.D.C.	C. O. Baines, Civil Engineer, Council Offices, Goole	do.
Limestone Road Metal (1,000 tons)	Risca (Mon) U.D.C.	J. Williams, Surveyor, Council Offices, Risca	do.
House, Grassington (Yorks)	.....	Empsall & Clarkson, Architects, 7, Exchange, Bradford	do.
Sewerage Works, Alvechurch	Bromsgrove R.D.C.	W. Fiddian, Surveyor, Stourbridge	do.
Sewers, Victoria-avenue, Blackley	Manchester Corporation	City Surveyor, Town Hall, Manchester	do.
*Rebuilding Plough Bridges, Byfleet	Chertsey R.D.C.	Council's Surveyor, Spinney Hill, Addlestone, Surrey	July 21
Kerbing, &c. (Contracts 1 and 2)	Wembley U.D.C.	W. Bagshaw, Public Offices, Wembley	do.
*Reconstruction of Sewers	Corporation of London	Engineers' Office, Public Health Department, Guildhall, E.C.	do.
*Tudor-street, Paving with Australian Hardwood	do.	do.	do.
*Excavating and Levelling, Fairlawn New Cross-road	London County Council	Architect's Department (Highways) 13, Charing Cross-road, W.C.	do.
*New Sorting Office, Tooting	Commissioners of H.M. Works, &c.	J. Wager, H.M. Office of Works, Storey's Gate, S.W.	do.
*Painting & Repairing Latrine Blocks, Norwood Schools	Lambeth Guardians	Guardians' Offices, Brook-street, Kennington-road, S.E.	July 22
*Buildings for Electric Lighting Works	Heston and Isleworth U.D.C.	Town Hall, Hounslow	July 23
Additions to Police Station, Grays	Essex County Council	F. Whitmore, Architect, Chelmsford	do.
*Enlargement of Post Office at Barrow	H.M. Works	H.M. Office of Works, Storey's Gate, Westminster, S.W.	July 24
*New Post Office at Merthyr Tydvil	do.	do.	do.
*New Coast Guard Station, near Faversham	The Admiralty	Director of Works Department, Admiralty, W.C.	do.
Sewers, &c.	Woodhall Spa (Lincs) U.D.C.	E. Bolton, Surveyor, Woodhall Spa, Lincs	July 25
*Sewering and Making-up Roads	Hornsey U.D.C.	Council's Engineer, 99, Southwood-lane, Highgate, N.	July 27
*Painting and other Works at Asylum, Hendon	C. L. Sick Asylum District	W. Lockwood, Architect, 36, Gerrard-street, Soho, W.	do.
*New Wards at West Hill Workhouse	Dartford Union	G. H. Tait, Longfield-street, Dartford	do.
*SchoolBldngs, &c., Elwick-rd., Eamont & BelmontGdns.	West Hartlepool School Board	School Board Offices, Park-road, West Hartlepool	do.
*Supply of Two Ten-tons Steam Road Rollers	Essex County Council	Chief Surveyor, County Offices, Chelmsford	July 28
*Children's Homes at Chipping Ongar	Hackney Union	W. A. Finch, Architect, 76, Finsbury-pavement, E.C.	July 29
*Making-up and Paving Chiddingtone-street	Fulham Borough Council	Borough Surveyor, Town Hall, Fulham, S.W.	do.
Station Buildings Shrewsbury	L. & N. W. and G. W. Railway Co.'s	A. E. Bolter, Paddington Station	Aug. 4
Two Houses, Blackburn-lane, Barnsley	.....	Jas. Clarke, 107, Doncaster-road, Barnsley	No date.
Road Works, Tottenham, N.	.....	F. Grover & Son, Ltd., Paxton-road, Tottenham	do.
Works at Manor House, Breighton, nr. Howden, Yorks	.....	T. S. Ullathorne, Architect, Selby	do.
Additions to All Saints' Church, Cockermouth	.....	J. Fleming, Market-place, Cockermouth	do.
Theatre, High-street, Kirkcaldy	.....	Swanston & Williamson, Architects, Kirkcaldy	do.
Additions to Asylum, Garlands, near Carlisle	The Committee	G. Dale Oliver, Architect, Carlisle	do.
Hotel, Doncaster-road, Mexborough	Messrs. Whitworth & Co.	G. White, Civil Engineer, Market-street, Mexborough	do.
Cast-iron Pipes	Spalding U.D.C.	J. G. Hawkins, Gas Engineer, Spalding	do.

[See also next page.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*Clerk of Works	County of London	5*l.* 5*s.* per week	July 20

Those marked with an asterisk (*) are advertised in this Number. Competitions, — Contracts, iv. vi. viii. x. & xxii. Public Appointments, xvi.

PRICES CURRENT (*Continued*).

LEAD, &c.

		Per ton, in London. £ s. d.	£ s. d.
COPPER—			
Strong Sheet	per lb.	0 0 10½	- - -
Thin	,,	0 0 11½	- - -
Copper nails	,,	0 0 11	- - -
BRASS—			
Strong Sheet	,,	0 0 10	- - -
Thin ,,	,,	0 0 11	- - -
TIN—English Ingots	,,	0 1 5	- - -
SOLDER—Plumbers'	,,	0 0 6	- - -
Tinmen's	,,	0 0 8	- - -
Blowpipe	,,	0 0 9	- - -

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft. delivered.
,, fourths	1¾d. ,, ,,
21 oz. thirds	3¼d. ,, ,,
,, fourths	2¾d. ,, ,,
26 oz. thirds	4d. ,, ,,
,, fourths	3¼d. ,, ,,
32 oz. thirds	5d. ,, ,,
,, fourths	4¼d. ,, ,,
Fluted sheet, 15 oz.	3d. ,, ,,
,, 21 oz.	4d. ,, ,,
½ Hartley's Rolled Plate	1¾d. ,, ,,
⅝ ,, ,, ,,	2d. ,, ,,
¾ ,, ,, ,,	2¼d. ,, ,,

OILS, &c.

		£ s. d.
Raw Linseed Oil in pipes or barrels	per gallon	0 2 0
,, ,, ,, in drums	,,	0 2 4
Boiled ,, ,, in pipes or barrels	,,	0 2 3
,, ,, ,, in drums	,,	0 2 7
Turpentine, in barrels	,,	0 3 6
,, in drums	,,	0 3 8
Genuine Ground English White Lead	per ton	20 10 0
Red Lead, Dry	,,	20 0 0
Best Linseed Oil Putty	per cwt.	0 8 0
Stockholm Tar	per barrel	1 12 0

VARNISHES, &c.

	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 8 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 0
Superfine Hard-drying Oak, for Seats of Churches	0 14 0
Fine Elastic Carriage	0 12 6
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 16 0
Finest Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Eggshell Flatting Varnish	0 18 0
White Copal Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 6
Berlin Black	0 16 0
Knotting	0 10 0
French and Brush Polish	0 10 0

TO CORRESPONDENTS.

E. S. (Amounts should have been stated).

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

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TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.* N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

BOURNEMOUTH.—For additions and alterations to the Cricketer's Hotel, Bournemouth, for Marston's Dolphin Brewery, Limited, Poole. Mr. Walter Andrew, architect and surveyor, Parkstone and Poole:—

Jenkins & Sons	£1,913	Williams & Son	£1,766
Millar & Sons	1,839	W. Hoare*	1,727
Jones & Sons	1,829		

[All of Bournemouth.]

DUDLEY.—For the erection of buildings at the Technical Schools, Stafford-street, for the Corporation. Mr. John Gammage, Borough Engineer, Town Hall, Dudley:—

Willetts & Son, Old Hill £739

HEATON MERSEY.—For the construction of a pumping-station, sewage works, &c., for the Heaton Norris Urban District Council. Mr. W. Banks, C.E., Council Offices, Heaton Moor:—

Gosling & Stafford, Stockport* £3,310 8 7

HELE (Devon).—For additions to Hele Paper Works, for the Hele Paper Company. Mr. Chas. J. Bulgin, architect, City Chambers, Exeter. Quantities by Mr. Vincent Cattermole Brown, of Paignton:—

G. Setter	£3,700 0	N. Pratt	£2,325 0
Labdon & Sons	2,563 10	Nicks Bros., Braddninch*	2,030 6

LANCHESTER.—For the erection of a house and smithy, Ford-lane, for Mr. W. Smith. Mr. T. E Taylor, architect, Prospect House, Lancaster. Quantities by architect:—

Excavating, Masonry, Bricklaying, Plastering, and Joinery.

Ward & Walton, Lanchester and Medomsley £312 10

LONDON.—For repainting Chelsea Bridge, for the London County Council:—

Proctor & Son	£2,325 0 0	A. H. Inns	£1,886 0 0
Vigor & Co.	1,953 0 0	M. McCarthy	1,799 12 0
W. Dudley	1,943 15 3	P. McCarthy*	1,617 14 4

LONDON.—For erecting sheet piling across the mouth of the Drawdock at Old Ford (Hackney-brook sewer), for the London County Council:—

T. W. Pedrette	£370 9 6	D. T. Jackson*	£322 7 6
Fasey & Son	351 7 0	Shelbourne & Co.	295 13 9
Pedrette & Co.	329 14 3	J. Sangwin	293 7 0

LONDON.—For the erection of the second portion of the Clapham car-shed, and laying of rails, &c., there, for the London County Council:—

Roberts & Co.	£36,528 0 0
Peirson & Co.	34,941 0 0
Joseph Jackson	34,541 10 0
F. G. Minter	33,612 0 0
Westwood & Co.	33,071 6 1
W. Norton	32,878 0 0
Shaw & Co.	32,277 0 0
H. L. Holloway	31,920 0 0
Perry & Co.	31,700 0 0
B. E. Nightingale	31,552 0 0
Grays Steel Construction Co.	31,202 0 0
F. & H. F. Higgs	31,020 0 0
Holloway Bros., Ltd.	30,875 0 0
Morton & Co.	30,355 0 0
Jones & Sons	30,240 5 2
Charles Wall	30,047 0 0
Pattinson & Sons	29,852 0 0
H. Lovatt	29,844 0 0
Kirk & Randall, Woolwich*	29,434 0 0

PAIGNTON (Devon).—For alterations and additions to stables at "Primley," for Mr. H. C. Belfield. Messrs. Bridgman & Bridgman, architects, Torquay and Paignton. Quantities by Mr. Vincent Cattermole Brown, Paignton:—

G. Webber	£1,375	E. Westlake	£1,230
C. & R. E. Drew	1,350	H. Drew, Paignton*	1,220
Webber & Sons	1,328		

[* Accepted with modifications.]

PAIGNTON (Devon).—For painting and decorative work at "Primley," for Mr. H. C. Belfield. Messrs. Bridgman & Bridgman, architects, Torquay and Paignton:—

Thomas & Co., Paignton* £325

PAIGNTON (Devon).—For formation of new roadway, &c., for the estate of Mr. H. C. Belfield. Messrs. Bridgman & Bridgman, architects, Torquay and Paignton. Quantities by Mr. Vincent Cattermole Brown:—

R. Harris	£495	Webber & Sons	£461
G. Webber	472	H. Drew, Paignton*	445

PAIGNTON (Devon). — For new Sunday-school premises for the Baptist Church. Messrs. Bridgman & Bridgman, architects, Torquay and Paignton. Quantities by Mr. Vincent Cattermole Brown, Paignton:—

Harris & Son, Paignton* £541

[Lowest of four tenders.]

SHEFFIELD. — For University College, Sheffield. Messrs. Gibbs & Flockton, architects, 15, St. James-row, Sheffield:—

	Contract No. 1.	Contract No. 2.	Total.
W. Hopkins	£36,502	£19,000	£105,500
G. Carr	62,910	7,700	70,610
Willcock & Co.	60,500	7,500	68,000
Hutchinson & Son	57,100	10,690	67,790
Hodson & Son	56 225	9,314	65,599
Roper & Sons	55,644	9,451	65,095
Armitage & Hodgson	57,072	7,109	64,781
Eshelby & Son	57,800	6,500	64,300
Dawson & Jones	56,850	6,520	63,370
Longden & Son, Ltd.	55,403	6,139	61,542
Ash, Son, & Biggin	55,200	5,980	61,180
Watt Brothers	55 000	6,063	61,063
Shillito & Son	58,000	3,000	61,000
Jas. Fidler, Sheffield, and Eckington*	53,800	6,700	60,500

SHILLELAGH (Ireland). — For the erection of labourers' dwellings, for the Rural District Council. Mr. J. J. O. Ramsay, architect, Dunlavin, co. Wicklow. Quantities by architect:—

No. of Dwellings.		
1	M. Connolly, Kilquiggin, Coolkenno*	£150
4	R. Doyle, Ballingate, Carnew,*	[£133,, £134 10s., £138, and £149
2	M. McCrea, Knocknalow, Clohamon,*	[£138 and £148
1	R. Carey, Coolroe, Tinahely*	£150
2	P. Neill, Knocheen, Coolkenno,*	[£150 each.
1	J. Cleary, Curravanish, Tinahely*	£140
2	J. Kennedy, Whiterock, Tinahely,*	[£145 and £150.
1	P. Doyle, Toberpatrick, Tinahely*	£150
14		

[Fences, entrance-gates, and out offices included in all cases, as well as dwellings.]

TEIGNMOUTH (Devon).—For new congregational schools. Messrs. Bridgman & Bridgman, architects, Torquay and Paignton. Quantities by Mr. Vincent Cattermole Brown, Paignton:—

G. H. Marshall	£3,530 0	F. C. Francis	£1,795 0
S. Blatchford	1,850 0	E. Andrews	1,750 10
J. Mumford	1,849 0	J. J. Hayman, Teignmouth*	1,7
H. Mills	1,815 0		

TEIGNMOUTH (Devon).—For dwelling house Crosspark for Mr. S. Lane. Messrs. Bridgman Bridgman, architects, Torquay and Paignton:—

F. C. Francis, Teignmouth* £490

[Lowest of four tenders.]

TORQUAY (Devon).—For new steam bakery premises for the Torquay Co-operative Society, Ltd., Central Premises, Union-street. Messrs. Bridgman & Bridgman, architects, Torquay and Paignton. Quantities by Mr. Vincent Cattermole Brown, Paignton:—

John Mumford, Torquay. At schedule prices.*

LONDON SCHOOL BOARD TENDERS.

At the last meeting of the London School Board the Works Committee submitted the following lists of tenders. Mr. T. J. Bailey is the Board's Architect:—

GLENISTER-ROAD.—School for mentally defective children—Three classrooms for 20 each, with power of extension, by one 20 classroom and enclosing, draining, and tar-paving the additional land:—

Turnbull & Son	£3,447	Greenwood, Ltd.	£3,014
Lawrance & Sons	3,342	Garrett & Son	3,001
Smith & Sons, Ltd.	3,253	J. & C. Bowyer	2,923
Akers & Co.	3,141	T. D. Leng	2,968
Wallis & Sons	3,139	Rice & Son	2,897
Johnson & Co.	3,102	Martin, Wells, & Co., Ltd., London and Aldershot*	2,831
Treasure & Son	3,101		
Bulled & Co.	3,001		
F. & H. F. Higgs	3,088		

[*See also next page.*

KNAPP-ROAD.—New school—Accommodation: Boys', 322; girls', 322; infants', 324—total, 968. Graded school on three stories, with playground for girls on roof. Halls: Boys', 50 ft. by 26 ft.; girls', 50 ft. by 26 ft.; infants', 50 ft. by 26 ft. Classrooms: Boys', 50, 48, 48, 48, 48, 40, 40; girls', 50, 48, 48, 48, 48, 40, 40; infants', 50, 50, 48, 48, 48, 40, 40. Drawing classroom, 61 ft. area; Science room, 618 ft. area (separate building in playground). Heating by low-pressure hot-water apparatus and open fires. House on west of site to be adapted for schoolkeeper:—

McCormick & Sons	£22,907	0	0	J. & M. Patrick	£21,963	0	0
John Greenwood, Ltd.	22,626	0	0	A. Porter	21,852	0	0
Johnson & Co.	22,547	9	8	Lawrance & Sons	21,744	0	0
F. & F. J. Wood	22,494	0	0	W. Downs	21,697	0	0
Perry & Co.	22,478	0	0	Smith & Sons, Ltd.	21,652	0	0
Macey & Sons, Ltd.	22,377	0	0	Munday & Sons	21,479	0	0
Longley & Co.	22,289	0	0	Gregar & Son	20,990	0	0
Grover & Son	22,272	0	0	Treasure & Son, London and Shrewsbury*	20,942	0	0
Shurmur & Sons, Ltd.	22,176	0	0				

"SPRINGFIELD."—Altering position of partitions and providing an additional glazed partition in order to redivide classrooms C, D and E into four rooms; reversing stepping, providing stoves, and rearranging doorways, &c. Replacing the old stoves in end classrooms with open-fire portable stoves and providing new Tobin tubes, &c.:—

Hooper & Son	£1,100	0		E. Triggs	£999	0	
Bulled & Co.	1,041	0		W. Hammond	995	0	
H. Bouneau	1,016	9		Garrett & Son	975	0	
F. & H. F. Higgs	1,015	0		W. Downs*	933	0	

WORDSWORTH-ROAD.—Providing and fixing a complete low-pressure hot-water apparatus and additional boiler for warming classrooms:—

Rosser & Russell, Ltd.	£866	10		Mather & Platt, Ltd.	£707	0	
Wippell Bros. & Row	850	0		Duffield & Sons	700	0	
J. & F. May	820	0		G. & E. Bradley	691	0	
J. Grundy	760	0		G. Davis	682	0	
The Brightside Foundry and Engineering Co., Ltd.	759	0		Turner & Co.*	679	0	

PUBLISHER'S NOTICES.

THE INDEX (with TITLE-PAGE) for VOLUME LXXXIV. (January to June, 1903) is given as a supplement with this issue

CLOTH CASES for Binding the Numbers are now ready, price 2s. 6d. each; also

READING CASES (Cloth), with Strings, price 9d. each.

THE EIGHTY-FOURTH VOLUME of "The Builder" (bound), price Twelve Shillings and Sixpence, will be ready on the 22nd inst.

SUBSCRIBERS' VOLUMES, on being sent to the Office, will be bound at a cost of 3s. 6d. each.

CHARGES FOR ADVERTISEMENTS.

COMPETITIONS, CONTRACTS, ALL NOTICES ISSUED BY CORPORATE BODIES, COUNTY AND OTHER COUNCILS, PROSPECTUSES OF PUBLIC COMPANIES, SALES BY TENDER, LEGAL ANNOUNCEMENTS, &c. &c.

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*** Stamps *must not* be sent, but all sums should be remitted by Postal Orders, payable to J. MORGAN, and addressed to the Publisher of "THE BUILDER," Catherine-street, W.C.

Advertisements for the current week's issue are received up to THREE o'clock p.m. on THURSDAY, but "Classification" is impossible in the case of any which may reach the Office after HALF-PAST ONE p.m. on that day. Those intended for the Outside Wrapper should be in by TWELVE noon on WEDNESDAY.

ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before TEN o'clock on WEDNESDAY MORNING.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

PERSONS Advertising in "The Builder" may have *Replies addressed to the Office*, Catherine-street, Covent Garden, W.C. *free of charge*. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage. Unused stamps are returned to advertisers the week after publication.

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STONE MERCHANTS & CONTRACTORS.
Chief Office.—*Warwick Road, KENSINGTON.*
Norway, Guernsey, and Leicestershire Granite, Kerb, Pitching, and Yorkshire Stone.
ESTIMATES GIVEN FOR EVERY DESCRIPTION OF ROAD MAKING.

W. H. Lascelles & Co.,
121, BUNHILL ROW, LONDON, E.C.
Telephone No. 1365, London Wall.
HIGH-CLASS JOINERY,
LASCELLES' CONCRETE.
Architects' Designs are carried out with the greatest care.
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WOODEN BUILDINGS,
Bank, Office, & Shop Fittings.
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FOR ALL THE PROVED KINDS OF
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Chief Office:—Norton, Stoke-under-Ham, Somerset.
London Agent:—Mr. E. A. Williams, 16, Craven-street, Strand.

Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 42, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds and milk-rooms, granaries, tun-rooms, and terraces. Asphalte Contractors to the Forth Bridge Co.

SPRAGUE & CO., Ltd.,
PHOTOLITHOGRAPHERS,
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METCHIM & SON { 8, PRINCES STREET, S.W. and 32, CLEMENT'S LANE, E.C.
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EVERY BLOCK BRANDED WITH OUR REGISTERED TRADE MARK.
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NOISELESS
During an experience of 68 YEARS we have found NO COWL so successful as the "EMPRESS" Expert Advice free in London Rail Fare only in Country
EWART & SON LTD. 346-350 EUSTON ROAD LONDON N.W.
Write for Catalogue "Section 30" Post Free

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"C" Series.

that it is now as important for builders to know all about HOT WATER HEATING as it is for them to know about ordinary grates?

The demand for Hot Water Heating Systems in residences, offices, and factories, is on the increase.

May we help you to keep abreast of progress in the heating line? Our catalogue "THE IDEAL FITTER, 1903," says the last word about Heating Appliances. A copy will be sent post free, on request.

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AMERICAN RADIATOR COMPANY 89 & 90, Shoe Lane, London, E.C.

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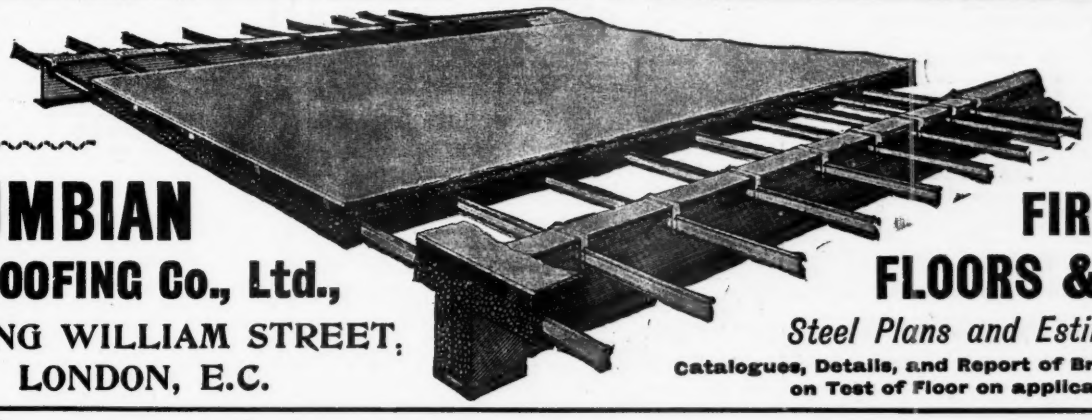

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Steel Plans and Estimates Free.
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Works: Royal Albert Victoria and Highgate Potteries, Tunstall.

Wall Tiles for Buildings, Hotels, Dairies, Shops, &c. White Glazed Tiles. Plain and Embossed Tiles in all Colours. Glazed and Printed Hearth Tiles. Hand Painted Tiles. Vitreous and Encaustic Tiles. Mosaic, &c., &c. Estimates and Designs supplied free on Application. A Large Assortment of all Classes of Tiles of Latest Designs may be seen at the London Show Rooms.

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Moderate Rates of Premium. Large Bonuses.

BONUS YEAR.—Participating Life Policies effected this year at full annual premiums will participate in the Profits for the Quinquennial Term ending 31st December next.

Prospectuses, Proposal Forms and Statements of Account may be had on application to

ROBERT LEWIS, General Manager.

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COMPLETE COURSES of PREPARATION for these Examinations are given, either in class, by correspondence, or in office, by Mr. RICHARD PARRY, F.S.I. A.M.Inst.C.E. Surveyor and Barrister-at-Law.

The nine months courses for the next examinations commence on the 9th June.

The value of Mr. Parry's system of preparing candidates for these professional Examinations may be estimated from the fact that in the course of the twelve years during which he has been preparing pupils his successes have been continually increasing. At each of the last two examinations the whole of the prizes awarded have been obtained by Mr. Parry's pupils namely—The Institution Prize, the Special Prize, the Beadel Prize, the Driver Prize, the Penfold Gold Medal, the Penfold Silver Medal, and the Crawter Prize.

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For particulars of the Courses of Work, or for any advice with respect to the Examinations, apply to Mr. RICHARD PARRY No. 82, Victoria-street, Westminster. Telephone, No. 680 Westminster.

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SANITARY INSTITUTE EXAMS.—Preparation for the Inspectors' Examination by a correspondence Course needing no Text Books or Acts, by C. H. CLARKE Assoc. San. Inst.; Fellow Inst. San. Engineers: Honours Medallist in Hygiene, &c.: Author of Clarke's "Aids":—Notes on Sanitary Law, 1s. 6d.: Examination Questions on San. Law, 6d.: Calculat on of Cubic Space, 1s.; Trade Nuisances, 6d.; Practical Drain Inspection, 6d.—Prospectus and "Aids" from 120, Thoroid-road, Ilford, E.

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Messrs. HOWGATE & BOND'S system of PREPARATION, personally or by correspondence, in three, six, nine, or twelve months courses. ARCHITECTURAL LENDING LIBRARY, including model drawings, casts, &c.—For syllabus and full particulars apply to Mr. A. G. BOND, B.A. Oxon. A.R.I.B.A. 115, Gower-street, W.C.

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SURVEYORS' ASSISTANTS and BUILDERS' CLERKS. Advertiser is prepared to give THREE PRACTICAL LESSONS in LEVELLING; explaining use of "Dumpy," reading the staff, reducing levels, &c. These lessons would take place in the evening. Fee, Half a Guinea for the three lessons.—Box 294, Office of "The Builder."

FOUNDERS' COMPANY.

BOND'S LEGACY.

APPRENTICES who have recently served their time to Members of this Company are ELIGIBLE to SHARE in the INCOME of this LEGACY.

Applications must be addressed before the 24th inst. to the Clerk,

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Founders' Hall, E.C.

TWO YOUNG MEN, with good connexion, and with thorough knowledge of their business (wholesale) desire to meet with gentleman to FINANCE them on reasonable terms. Large builder or building company would find this a profitable undertaking as every possible advantage of the advertisers' knowledge of the markets would be given.—Reply in first instance principals only A. 132, Shelley's Gracechurch-street, E.C.

BILLS OF QUANTITIES, &c.

LITHOGRAPHED CORRECTLY BY RETURN OF POST. A LIBERAL DISCOUNT OFF USUAL PRICES. PLANS BEST STYLE.

ALLDAY, LIMITED.

Shakespeare Press, Birmingham.

TO the CUSTOMERS and CREDITORS and all persons doing business with the firm of Walter Hawker, of 378, Old Kent road, S.E.

KINDLY TAKE NOTICE that the above-named Walter Hawker died on the 16th March, 1903, intestate, and that on the 27th April, 1903, letters of administration to his estate were granted by the Principal Probate Registry of His Majesty's High Court of Justice to Mrs. ELLEN HAWKER, the widow.

The business of a plumber, gas-fitter, &c. carried on as above, has since such death (by arrangement with the next of kin) been carried on by the said Mrs. Ellen Hawker under the style of Walter Hawker, and she will continue to carry on the same under that style (for her own benefit and not as administratrix), and she will receive all debts due to and will pay all debts due and to accrue due from the said business. The management of the said business will be the same as hitherto; two of the sons of the late Walter Hawker, who were employed in the business, continuing in such employment.

Dated 4th July, 1903.

W. R. MILLAR & SONS,
No. 53, Borough High-street,
Southwark.
Solicitors for the Administration of the late Walter Hawker.

WILLIAM WHITE deceased. Pursuant to the Statute 22 and 23 Victoria Chapter 35. Notice is hereby given that all CREDITORS and other persons having any debts claims or demands against the Estate of WILLIAM WHITE late of 30A Wimpole-street, and of Gayton-road Hampstead in the County of Middlesex Esquire Architect who died on the 22nd January 1900 and whose Will was proved on the 15th day of December 1900 in the Principal Probate Registry of the High Court of Justice by the Right Honorable William Earl of Stamford of 15 St. James-place and Charles Francis Martelli of 10 Staple Inn both in the County of Middlesex the Executors therein named are hereby required to send particulars in writing of their debts claims or demands to me the undersigned Solicitor for the said Executors on or before the 12th day of August 1903 after which day the said Executors will proceed to distribute the estate of the said deceased having regard only to the claims of which they shall have had notice and that they will not be liable for the assets or any part thereof so distributed to any person or persons of whose debt claim or demand they shall not then have had notice

Dated this 3rd day of July, 1903

CHARLES F. MARTELLI 10 Staple Inn London W C
Solicitor for the said Executors.

AN ARCHITECT and SURVEYOR, who has been in practice 25 years (in a town 20 miles S.W. of London), is desirous of disposing of same, together with his Freehold house and premises containing 12 rooms, small garden and outbuildings, and two good offices adjoining. Situate in main street, ten minutes' walk from railway station and five minutes from river. Price for the whole, 2,000*l.* Office fittings and furniture by arrangement.—Architect's Practice, Box 193, Office of "The Builder."

TO LET, THREE WELL-LIGHTED ROOMS, 24 ft. by 18 ft. 15 ft. by 11 ft. 10 ft. by 6 ft. communicating, suitable for an Architect, at 28, Berners-street, Oxford-street. Rent 50*l.*—Apply at above address

AUCTIONEER and SURVEYOR, F.S.I. is desirous of SHARING EXPENSES of his TOWN OFFICES in best part of Chancery Lane with an Architect or other Professional Man.—Box 221, Office of "The Builder."

WANTED, a BUILDER'S MANAGER, with a view to PARTNERSHIP in a very old-established Builder's business.—Box 211, Office of "The Builder."

PARTNERSHIP.—A.R.I.B.A. aged 33, with special experience of good work in England and abroad, desires SHARE in an established practice.—Apply, in confidence, to KENT, Solicitor, 47, Buckingham Palace-road, London, S.W.

COUNTY of LONDON.

TENTH (LONG GROVE) ASYLUM, EPSOM, SURREY.

A CLERK of WORKS is REQUIRED to supervise the putting in of the foundations of this Asylum.

Salary 5*l.* 5*s.* per week.

Persons desirous of applying should send stamped addressed foolscap envelope to the undersigned for a form of application.

Applications to be addressed to the Clerk of the Asylums Committee, No. 6, Waterloo-place, London, S.W. endorsed "Clerk of Works," and delivered by or before TEN o'clock a.m. on MONDAY, 20th JULY, 1903.

No canvassing permitted.

Selected candidates will be written to.

E. W. PARTRIDGE,
Clerk of the Asylums Committee.

Asylums Committee Office,
No. 6, Waterloo-place,
London, S.W.
July 3rd, 1903.

CHEPSTOW URBAN DISTRICT COUNCIL.

APPOINTMENTS OF SURVEYOR AND INSPECTOR OF NUISANCES.

The Council invite APPLICATIONS for the above Appointments.

The person appointed will be required to perform the usual duties appertaining to the above-mentioned offices, which also include the collection of the Tolls of the Cattle Market fortnightly and the supervision of the Cemetery of the Burial Board, and must give a bond of 100*l.* in some approved guarantee society.

The salary will be 100*l.* per annum.

Applications stating age and accompanied by copies of three recent testimonials (which will not be returned) must reach me on or before JULY 25th, endorsed "Surveyor."

FOTHERGILL EVANS,
Clerk.

Council Offices, Chepstow.
June 30th, 1903.

DRAUGHTSMAN (smart) WANTED, with an up-to-date knowledge of Steel Construction. Must be quick and reliable. Good opening for worker.—Address, giving full particulars, to DRAUGHTSMAN, care of Judd's, 5, Queen Victoria-street, E.C.

ARCHITECT'S DRAUGHTSMAN with good knowledge of construction and style WANTED for a temporary JOB of several months.—Write, stating experience and salary required, Box 287, Office of "The Builder."

ARCHITECT'S CHIEF ASSISTANT REQUIRED in well-known City Office.—State full particulars and salary, Box 260, Office of "The Builder."

ARCHITECT'S HEAD ASSISTANT in well-known London office. Must be competent. Salary 3*l.* 3*s.* per week.—Address, with full particulars, to Box 255, Office of "The Builder."

A LAND AGENT & SURVEYOR, about to develop a small suburban Freehold Building Estate, REQUIRES an ARCHITECT'S ASSISTANT accustome to prepare plans and specifications for small villas and used to usual office routine.—Apply by letter, with qualifications and references, to E. FERGUSSON TAYLOR, New Barnet, Herts

ARCHITECTS and SURVEYORS.—GENTLEMAN wanted as ASSISTANT MANAGER and CONSULTING ENGINEER in the London office of an old established firm of hygienic engineers. No previous experience necessary, as can be trained. Must be a quick architectural draughtsman, have a thorough knowledge of office routine, specifications, and estimates and energetic (the latter a sine qua non).—Address, with full particulars, age, and salary required, Box 292. Office of "The Builder."

ARCHITECTURAL ASSISTANT (competent) REQUIRED.—Apply, with full particulars as to age, experience, and salary required, to FISHER & MILNES, 8, Rowcroft, Stroud, Glos.

ARCHITECT & SURVEYOR'S ASSISTANT WANTED immediately for a temporary engagement. He must be capable of taking off quantities and adjusting builder's accounts.—Apply, stating age, salary required, and references to E. JEEVES, Architect, Melton Mowbray.

ARCHITECT'S ASSISTANT Required in a West-End Office. A good draughtsman, practical, and experienced in specifications, working up plans and sections, measuring up, alterations, &c.—Full particulars and salary required to Box 296, Office of "The Builder."

ARCHITECT (near Manchester) REQUIRES thoroughly experienced, able SENIOR ASSISTANT. Must be good designer.—Apply, with full particulars and salary required, M. 89 Amphill-road, Aigburth, Liverpool.

HEATING.—WANTED, an experienced DRAUGHTSMAN in the London district, by an old-established firm of Heating and Ventilating Engineers. Applicants must have had previous experience in the design and planing of low pressure steam and hot-water heating installations, also ventilation on the "Plenum" system.—Address, stating age, salary required, when last employed, and references, Box 264, Office of "The Builder."

A Firm of Quantity Surveyors old and long established with large practice have an immediate VACANCY for a Gentlemanly YOUTH as articled PUPIL. Premium 150*l.* part returnable as salary by arrangement. Pupil will be under direct supervision of principals. Address, Box 295, Office of "The Builder."

VACANCY for PUPIL in Office of Civil Engineer, Architect, and Surveyor. Town and country offices.—Address, Box 288, Office of "The Builder."

GENTLEMANLY LAD WANTED in London office, under indentures. Premium returned as salary.—B x 194, Office of "The Builder."

ADVISORY REPRESENTATIVE WANTED, to consult with Architects in connexion with application of a well-known SANITARY PATENT to public and other buildings. A practical knowledge of architectural drawing and specifications necessary.—Address, stating age, qualifications, and salary expected, Box 293, Office of "The Builder."

CLERK of WORKS REQUIRED, who can prepare working drawings and specifications of plain workshop sheds, conforming to County Council regulations.—State wages, experience, &c. to Box 286, Office of "The Builder."

LIME and CEMENT MERCHANTS.—MANAGER REQUIRED for a Branch Depot at Tottenham. Knowledge of the trade essential. Also a TRAVELLER for the same depot.—Applications in writing to JOHN BYFORD & SON, Moody Wharf, Poplar, E.

TRAVELLER WANTED for MARBLE and MOSAIC, TILES, &c. to take up a well-canvassed ground in London and suburbs amongst Architects, Decorators, and Builders.—State experience, terms, &c. Box 289, Office of "The Builder."

TRAVELLER WANTED by Artificial Stone Manufacturers for town and suburbs. Must be energetic, and hold first rate testimonials.—State experience, age, and terms, Box 257, Office of "The Builder."

GOOD MANAGING and ESTIMATING CLERK REQUIRED in an old-established Builder's office in West of England. Permanent. Experienced in taking off quantities, measuring up, and adjusting accounts. Good draughtsman, and general routine. Good references indispensable.—State age, experience, and salary to Box 285, Office of "The Builder."

BUILDER'S CLERK (competent) WANTED, well up in the timber trade and saw mill charges, good timekeeper and early riser, for Government Contract, Aldershot.—P. B. C. Preston-street, Fleetwood.

BOOKKEEPER WANTED in Builder's Office in the Midlands. Permanency to a suitable man. One with a knowledge of shorthand and typewriting preferred.—Address, giving references, age, and salary required, to Box 290, Office of "The Builder."

BUILDER'S CLERK (efficient) WANTED; must be quick, accurate, good writer, and well up in general office work.—State full particulars, age, references, and salary for permanency to BEALE & SON, Tunbridge Wells.

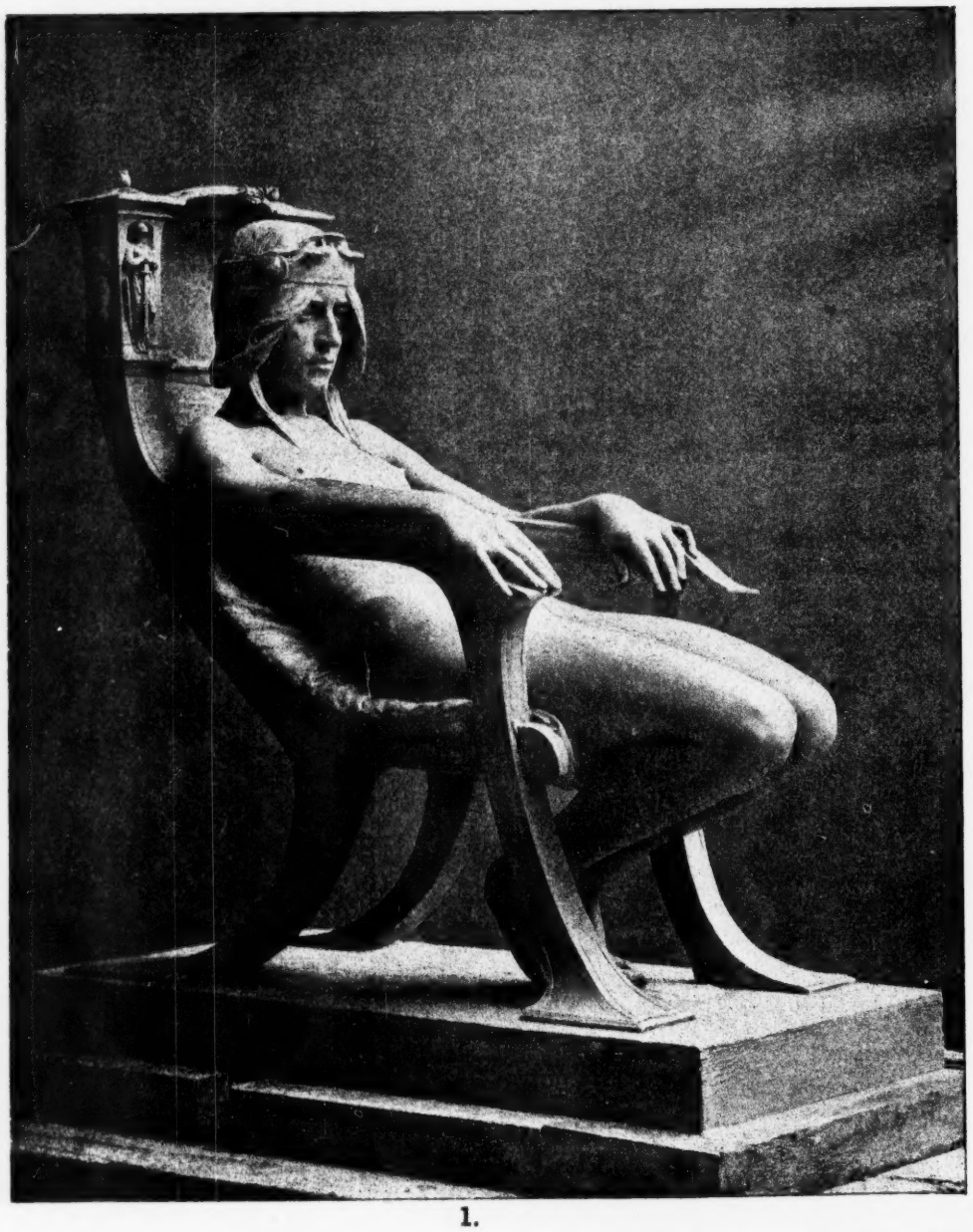
CLERK WANTED for Builder's Jobbing and General Business in country town. Married man preferred. Must be steady, reliable, and able to undertake prime cost, estimating, and general office routine.—Apply, giving references, age, and wages required, to Box 251, Office of "The Builder."

BUILDER'S CLERK WANTED, aged about 20 North London.—Full particulars, age, and salary required, Box 253, Office of "The Builder."

ESTIMATING CLERK, with a good knowledge of Bookkeeping, WANTED, for Building and Decorating Department.—Apply by letter only, stating (in confidence), previous experience and salary required, to BARKER & NEALE, 13, Lowndes-street, Belgravia, W.

CLERK WANTED in BUILDER'S OFFICE, chiefly for tracing; must be neat and quick tracer.—Box 215, Office of "The Builder."

BUILDER'S ESTIMATING & CORRESPONDENCE CLERK WANTED, Eastbourne. One used to shorthand and typing (Remington).—Apply BAINBRIDGE & SON Builders, Eastbourne



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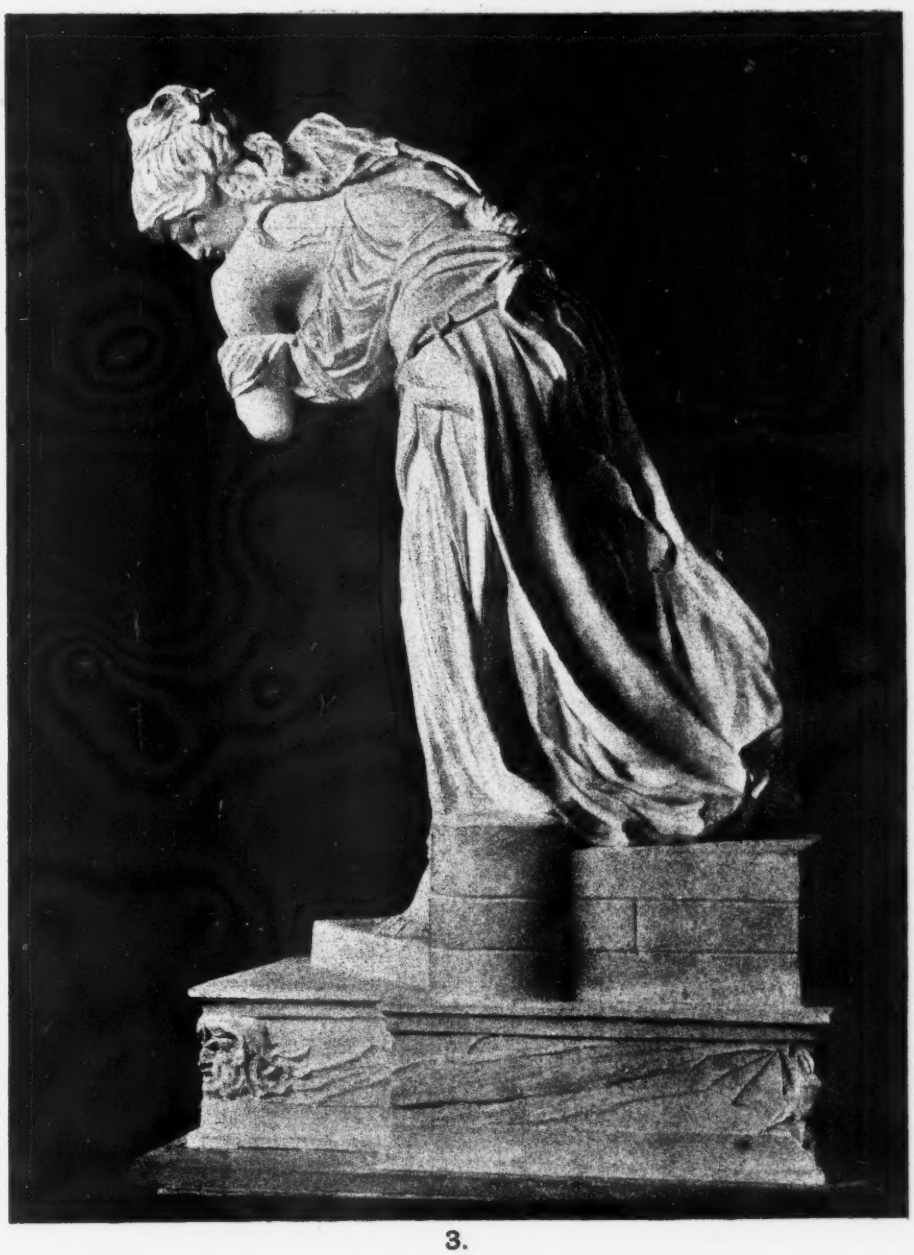

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TINA-PHOTO, SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

HULL TOWN HALL COMPETITION: FIR

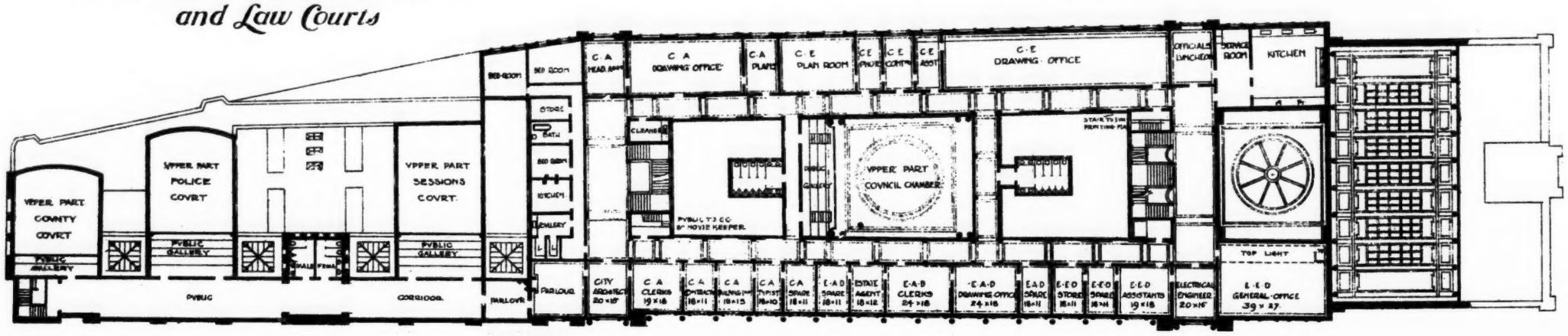
MESSRS. RUSSELL, COOPER & DAVIS AND C.

PHOTO LITHO SPRAGUE & Co LTD 4 & 5 EAST HARDING STREET FETTER LANE E.C.

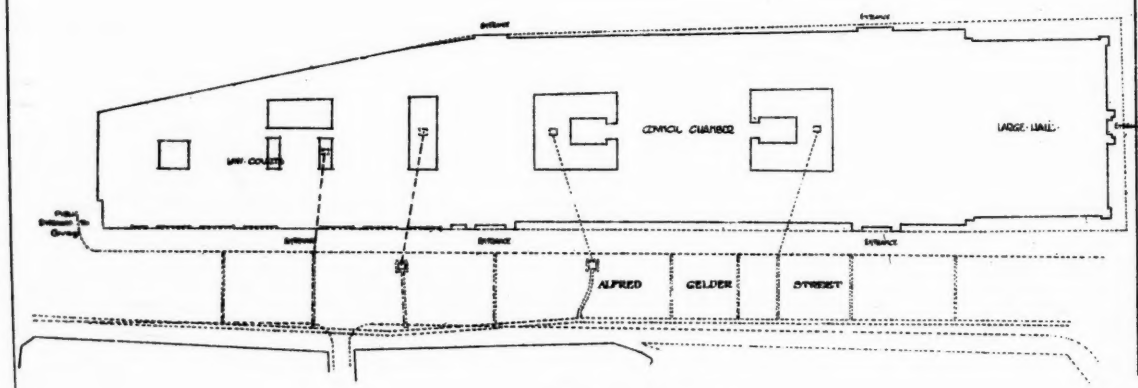
OMPETITION: FIRST PREMIATED DESIGN.

ER & DAVIS AND C. E. MALLOWS, ARCHITECTS.

Hull—Town Hall
and Law Courts

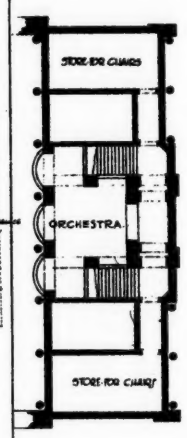


SECOND·FLOOR·PLAN

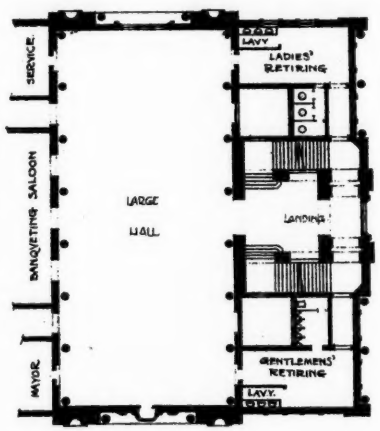


BLOCK·PLAN

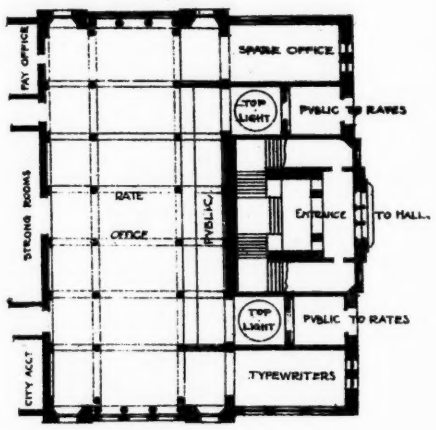
PROPOSED·FUTURE·HALL



SECOND·FLOOR·PLAN

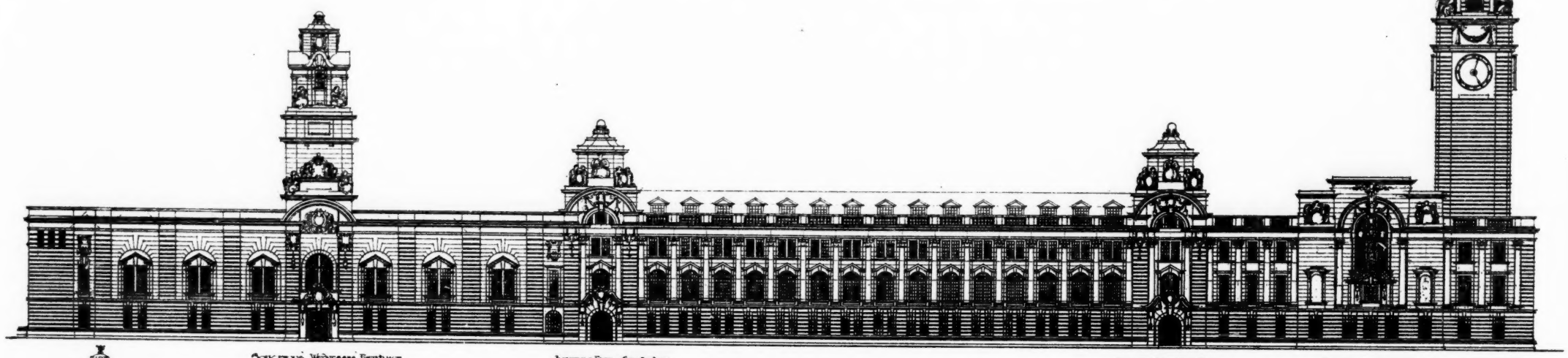


FIRST·FLOOR·PLAN



GROUND·FLOOR·PLAN

Hull Town Hall and Law Courts



Solicitors' & Witnesses' Entrance

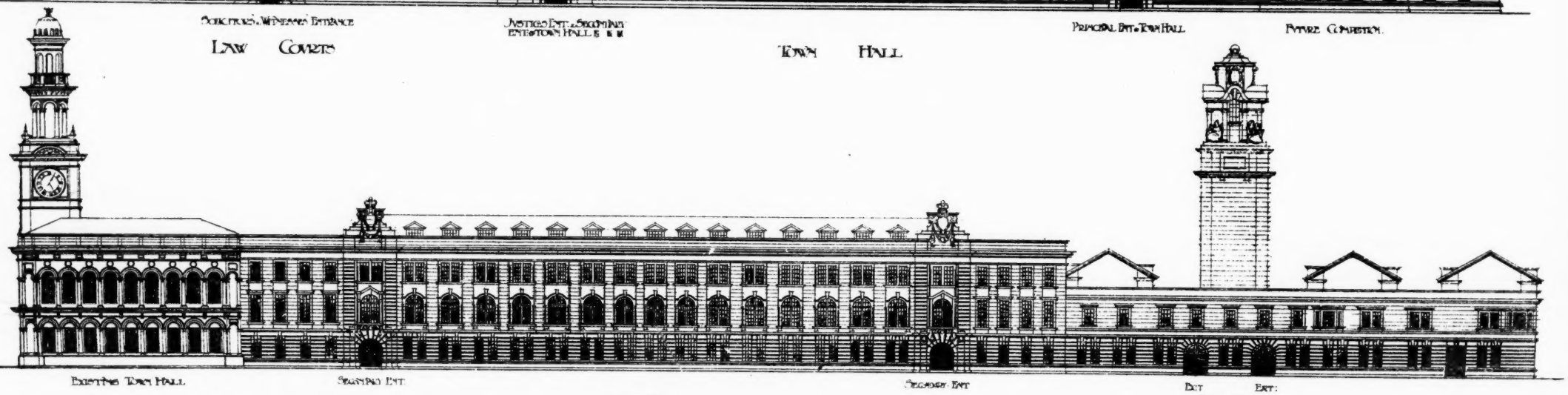
Justices Ent. & Secretary's Ent. to Town Hall

Principal Ent. to Town Hall

Future Extension.

Law Courts

Town Hall



Existing Town Hall

Justices' Ent.

Secretary's Ent.

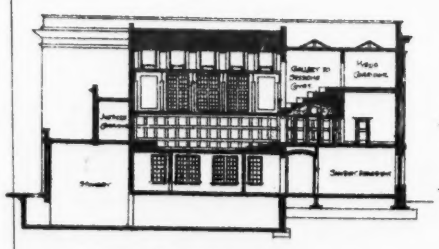
Ent.

Ent.

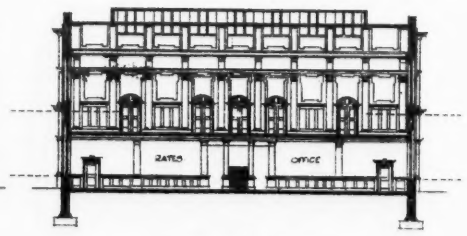
Law Courts.

Town Hall.

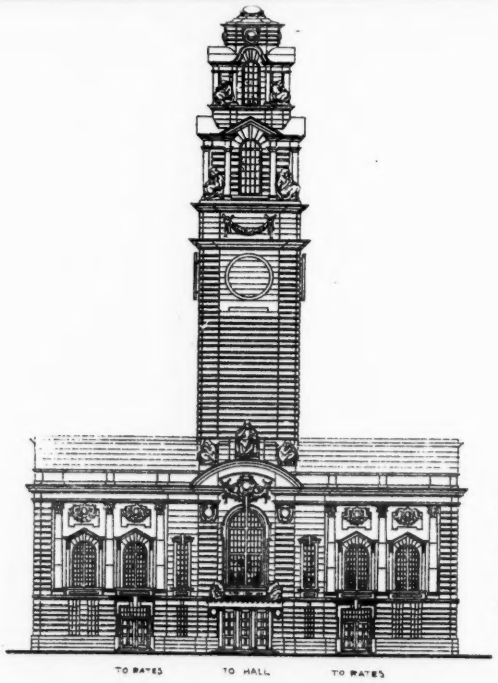
TOWN HALL



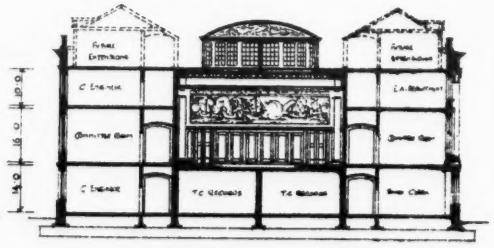
SECTION · D·D



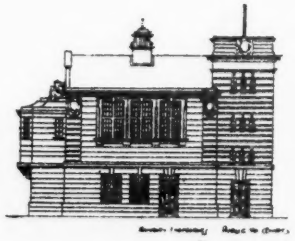
SECTION · B·B



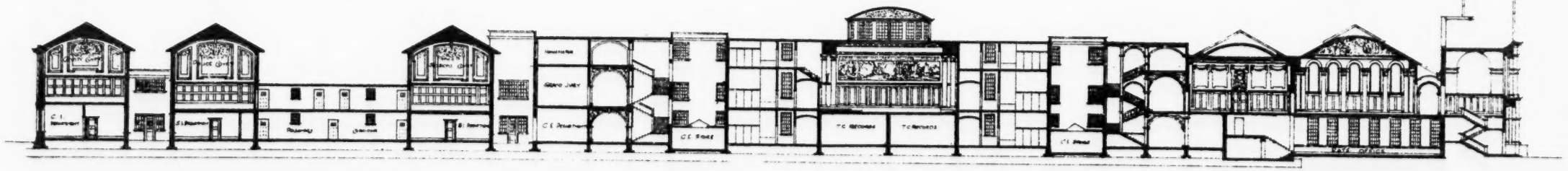
RIVR. ELEVATION TO LOWGATE



SECTION C·C



WEST ELEVATION



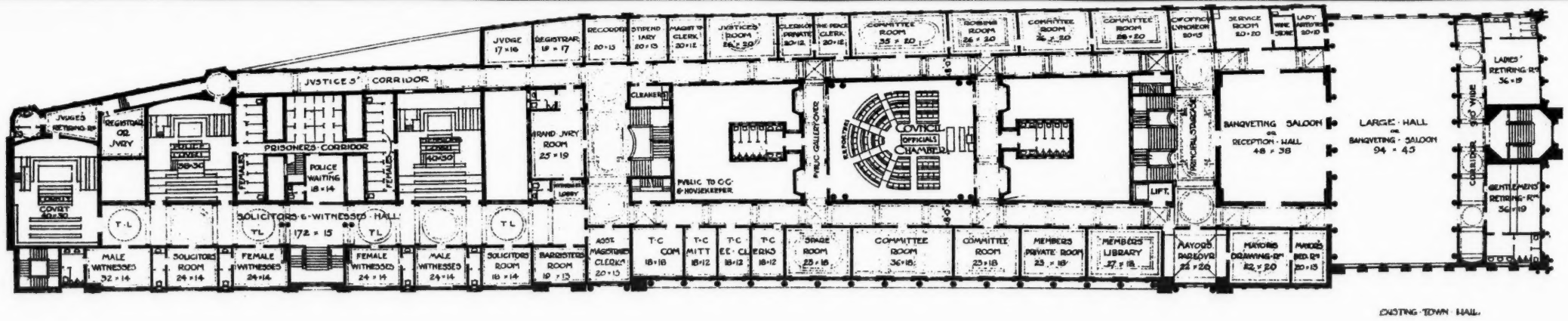
SECTION A·A

Feet 50 40 30 20 10 0 50 100 150 200 Feet

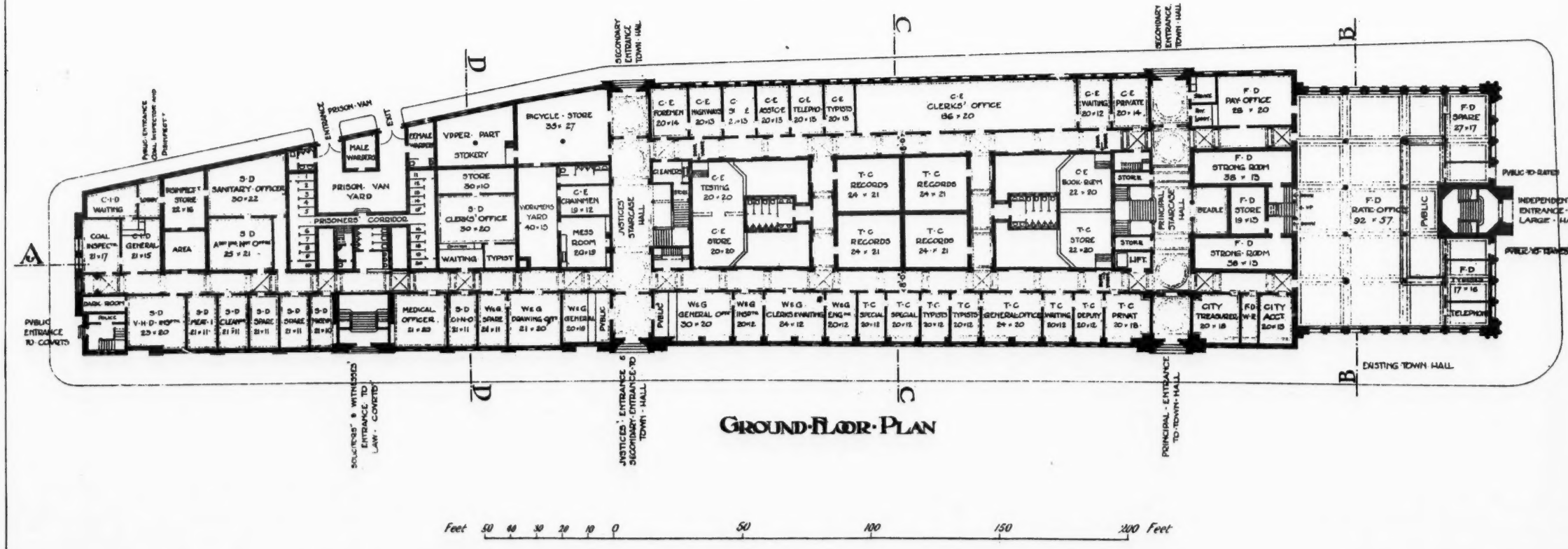
PHOTO-LITHO. SPRAGUE & Co LTD. 4 & 5. EAST HARDING STREET FETTER LANE. E.C.

HULL TOWN HALL COMPETITION: FIRST PREMIATED DESIGN.

MESSRS. RUSSELL, COOPER & DAVIS, AND C. E. MALLOWS, ARCHITECTS.



First Floor Plan


PRISON VAN YARD
PRISONERS' CORRIDOR
SOLICITORS' & WITNESSES' ENTRANCE TO LAW COURTS
JUSTICES' ENTRANCE & SECONDARY ENTRANCE TO TOWN HALL
PRINCIPAL ENTRANCE TO TOWN HALL
EXISTING TOWN HALL
Feet 50 40 30 20 10 0 50 100 150 200 Feet

Ground Floor Plan

PHOTO-LITHO. SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

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